

FLIGHT

First Aero Weekly in the World.

Founder and Editor: STANLEY SPOONER.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

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CONTENTS.

	PAGE
Editorial Comment:	
Air Raids and Reprisals	605
Should London be Warned?	606
Lord Northcliffe and the Air Board	608
Consolidating a Key Industry	608
Constructional Details—XVIII (with scale drawings)	609
National Physical Laboratory Report for 1916-17	611
Honours	613
The Roll of Honour	614
Royal Aero Club. Official Notices	615
American National Advisory Committee for Aeronautics Report..	615
Answers to Correspondents	616
Airisms from the Four Winds	617
Aviation in Parliament	622
Personals	625
"X" Aircraft Raids	626
The British Air Services	627
Aircraft Work at the Front. Official Information	631
Imports and Exports, 1916-1917	632

EDITORIAL COMMENT.

Air Raids and Reprisals. IN the pursuance of their dastardly policy of carrying out aerial raids on open towns and villages, the Germans have done at least one good thing for this country. They have at last created a volume of public opinion in favour of preventive reprisals which this or any other Government simply cannot—dare not—ignore. Until the raid on the Metropolis last week there was a distinct cleavage of opinion among the thinking classes as to the justice and advisability of carrying the air war into the enemy's country and bombing his open towns as he has not shrunk from bombing our own. Now there are scarcely two views—the nation demands that reprisals should be undertaken at once and that they should be continued without ruth or pity unless or until the Huns agree to cease the attacking of defenceless civilians, women and children. The demand has received such definite expression in almost every quarter that the Government simply cannot ignore it, and we do not think they will.

We have said there are no two opinions in the matter. That is true, but only to a somewhat modified degree. By far the great majority of the

people demand reprisals; but there is still a very small, but by no means negligible, minority which is even now against treating the enemy to the same medicine he is so fond of employing against ourselves. Their principal objections are taken on the ground that the killing of German civilians is un-Christian, and that when the war is at an end we want to appear before the tribunal of the Neutrals with clean hands and as chivalrous fighters who have kept within the four corners of the conventions which are supposed to govern the conduct of war between civilised nations. Moreover, they argue that the Germans are so essentially brutalised by the military machine which governs them that any policy of reprisals we are compelled to adopt, or which we choose to put into operation, would be utterly futile, since the military and the Government would not regard the killing off of a few thousands of civilians as of any importance, and would only accentuate their policy of frightfulness against ourselves.

To begin with, war itself is un-Christian and cannot be reconciled with a single one of the teachings of Christianity. It can be argued, therefore, that we ought never to make war, even in defence of our most sacred rights and liberties. To be entirely logical, the people who base their opposition to reprisals on their un-Christian character should argue that, in August, 1914, we ought to have sent our soldiers and sailors home and sat down with folded hands to await in passivity the arrival of the invading Hun. Before they are entitled to be listened to at all, they must first tell us quite clearly how far we may be allowed to go in the whole matter of war and defence, and with what weapons we are to be allowed to make war, supposing they concede we may make it at all. Let us take the illustration of the German use of poison gas. We did not want to use it, because it did not seem to us to be "playing the game." But the Hun had no such scruples and used it. He gave us thereby the choice of two alternatives—to sacrifice the lives of thousands of our men to the most horrible of all devices of war and to thereby lose the latter, or to copy his example and go one better. We know the choice that was made, and rightly made. We also know the result, and that our choice of alternatives was thoroughly justified by them. The use of poison gas is a dirty game anyway. We certainly did not want to adopt it, and should not have done had the Germans played the decent game. So with several other dirty devices: we have been compelled to use them in order to save the lives of our own men.

and to avert almost certain defeat, which we should have incurred if we had been too squeamish to adopt them. Where a policy of reprisals differs from any of these we are totally unable to see, unless it can be proved beyond reasonable doubt that it would not produce the designed effect of stopping enemy raids on our own shores. We shall come to that presently.

The next objection is the one that we want to appear before the nations with clean hands. Well, can we not defend our shores against these murderous raids by the only methods which are effective and still claim that our hands are clean? We think so. No one would dream of asserting that the hands of the Judge who sentences a murderer to death are otherwise than clean. And, bear in mind, that sentence of death is imposed not by way of taking revenge on the murderer for his crime, but in order to deter others from following his example. So it is in the case of reprisals for air raids. They are not to be undertaken as a method of revenge for the murder of our own people, but as a deterrent to the enemy, who is told in unmistakable terms that the remedy for the killing of his own people is in his own hands, and that when he ceases to raid our towns we will immediately cry off the raids on his cities. The proposition is elementary in its simplicity.

We now come to the consideration of the last objection, which is, that reprisals would not be likely to produce the effect their advocates claim for them. This is, to our way of thinking, the most important of all—the only one that really matters, since we cannot allow that there is any longer room for considerations of sentiment. It goes without saying that if we start on a policy of heavy reprisals we are going to lose in carrying it out a large number of pilots and machines that we cannot afford to sacrifice in futilities. Therefore on that ground alone reprisals are out of court if they are not going to achieve their object, which is to stop raids on British towns. Now, it seems to us that the Germans who are responsible for the raids on England, and our own people who argue against reprisals on the grounds with which we are now dealing, both suffer from a common fault. They each argue from a relatively perfect understanding of the psychology of their own people and an almost complete ignorance of that of the other side. That arch-priest of "frightfulness," von Bernhardt, in his book, "Germany in the Next War," advocates the taking of measures in war which will strike terror into the civilian population of an enemy country in order that the people may, in their excess of terror, compel their Government to accept whatever terms Germany may choose to exact. Why does von Bernhardt think the civilian population of England is likely to "squeal" under punishment to a degree that would force an irresistible demand for peace at any price? The obvious answer is that, knowing his own people, and knowing very little about the characteristics of any other, he quite naturally concludes that we or the French would behave under a given set of circumstances exactly as would the Germans. That is to say, von Bernhardt tacitly admits that if we, or any other nation which happened to be at war with Germany, were to inaugurate and press to a conclusion such a policy as that outlined for our undoing by the Germans, there would arise such a howl that the German Government might quite possibly be compelled to accept such a peace as we saw fit to impose. Conversely, the opponents of reprisals in this country know perfectly well that, whatever

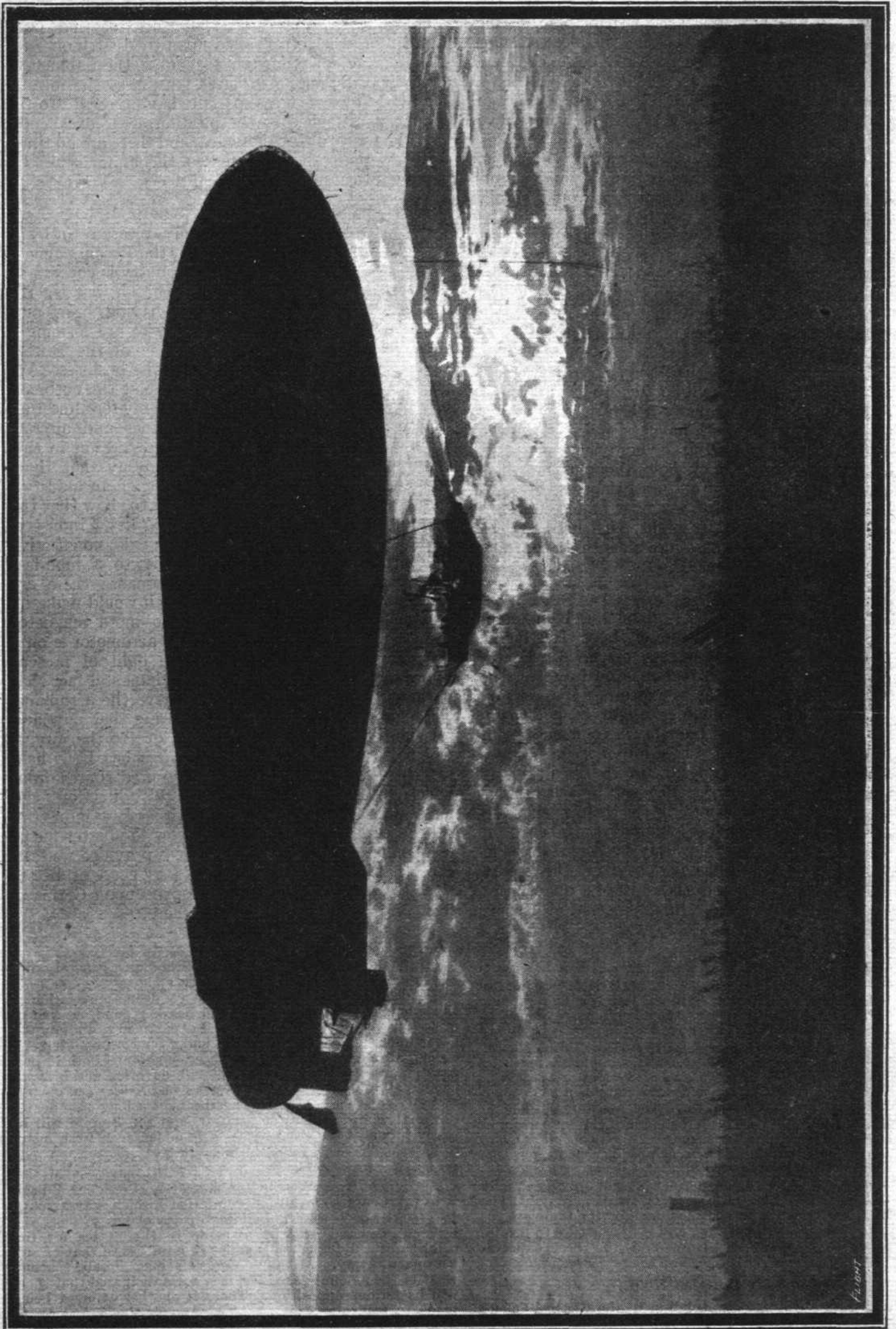
happens in the matter of these continued raids and the murder of non-combatants, the British people will never descend to accepting defeat in the way the enemy believes. They, therefore, believe the Germans to be equally proof against attacks of "nerves." We take leave to think that von Bernhardt knows the psychology of the Hun better than we, and that a real policy of reprisals, coupled with a stern warning that so long as raids on this country are continued it will be pressed home with all our power, would very soon produce such an outcry in Germany that the game would be pronounced to be not worth the candle. Whether we are right or wrong in our conclusions there is no room for doubt about the main proposition, which is, that reprisals will have to be tried as a remedy. The nation has been very patient under the strain, but the breaking point is near. The authorities have practically admitted that what we have maintained in the past in correct, and that there is no method of preventing raids. The people generally have now accepted our further proposition that the only manner of stopping them is by a method of cure—in a word, reprisals and yet more reprisals.

Should London be Warned?

A great deal has been made of the fact that no system of warning London in case of an impending air raid has been thought out by the authorities. Many claim that if such a system had been in operation on the occasion of last week's raid the death-roll would in all human probability have been much lighter, since people who were in the streets would have had an opportunity of getting into shelter and schools and factories cleared of their inmates. We fully appreciate the motives of those who advocate warning the population of London, or of any other place, when raids are impending or possible, but we are afraid we are unable to see eye to eye with them. If we take last week's raid as our case in point, so far as we are able to learn, the time that elapsed between the knowledge that enemy aircraft were making for London and the explosion of the first bomb was a matter of minutes only. Now, supposing warning had been given, what would most probably have happened in the case of the East End school which was struck and in which a dozen poor little children were done to death? At the first sound of the warning there would have been a rush of distracted parents to the school, all intent on removing their little ones to a place of safety, and it is far more than likely that we should have had to record a much heavier loss of life than was actually the case. We have before us a personal and private letter from a lady, one of the principal inspectors of L.C.C. schools, which was sent to us without any idea in the world that its contents would be published, and was not in any way written for public consumption. This is what she says:—

"These air raids are a great strain on the teachers. In many districts the false alarm on Thursday caused the teachers more worry than the real thing on Wednesday. In one school in the dock area the gates were locked—big iron gates with spikes on the top. The parents lifted the gates off the hinges and rushed in for their children. It was a marvel that no one was hurt. *This happened on Thursday.* On Wednesday I was in an infants' school, and both children and teachers behaved splendidly."

It is not at all difficult to visualise what would have happened had bombs been dropped on this school at



FROM "THE WAR IN ITALY."—An airship leaving at sundown. (Reproduced by special permission of the Italian Government.)

that particular moment. As a matter of fact, the children are much safer in school than in scattering to their homes or wandering about the streets. One school was struck, with a death roll of a dozen children, but it is permissible to think that if there had been a general and sudden exodus of all the school children of London into the streets the fatalities would have been far greater in number.

There is another aspect of "warnings." That is, the enormous disorganisation of business and manufacture which a "general" warning would entail. The moment the warning was heard practically the whole business of London would come to a standstill and would not be seriously resumed that day, a state of affairs calculated to please the Hun no end. Nor is it at all certain that the number of casualties would be reduced. The only thing that might conceivably happen is that the incidence would be shifted a little, if we may put it that way. It is more than possible that, if a general warning had been given last week, some who were killed would be alive to-day, but it is almost a certainty that many others who were not touched as it was would have been killed in the streets as they were making for home or some other presumably safe place. We have thought the whole thing over very carefully, and on balance we do not think that any systems of warnings would assist in reducing casualties, while it might, particularly in the case of raids by daylight, produce an entirely contrary effect.

Lord Northcliffe and the Air Board.

Obviously the rumours which associated the name of Lord Northcliffe with the presidency of the Air Board, in succession to Lord Cowdray, were at least a little premature. His mission to America looks as though it might be a lengthy affair, and until he has brought it to a successful conclusion we cannot hope to see him more intimately associated with the Air Board. In the meantime it is certain his presence in America will be felt in relation to aircraft at the front. It is curious that, up to the time of writing, no announcement has been made with regard to Lord Cowdray's reported decision to retire from the presidency. In fact, the report has not even been voiced in the form of a question in the House. We can take it, therefore, that either the

France and Germany's Great Effort.

AN official statement issued in Paris last week states that Germany intends to be able to put into the fighting line by the spring of 1918 a total of 3,500 aeroplanes, a considerable number, remembering that to keep machines in flying order a fresh supply of 50 per cent. per month for chaser aeroplanes and 30 per cent. for other aeroplanes must be allowed for.

"Helped by America," continues the statement, "we shall maintain our mastery of the air. The assistance asked of the United States includes, from the point of view of personnel the despatch of a first contingent of American pilots, who will complete their training at French flying schools, and the despatch, already carried out, of a contingent of French instructors to the United States. America will provide equally powerful support from the point of view of material. The programme worked out and decided upon by the Flying Corps is being developed methodically, and is of a nature to inspire us with the strongest confidence and the best expectations."

More Praise from Sir Douglas Haig.

IN his message of congratulation to the General Officer Commanding the Second British Army after the victory at

report had its origin in the fertile imagination of "Our Parliamentary Correspondent" or that Lord Cowdray has been prevailed upon to "carry on" for at any rate long enough to enable the Cabinet to find a worthy successor. We trust it is the former, for Lord Cowdray has, especially having regard to the handicaps attached to the position, done excellently since he went to the Air Board, and these are no times for "swapping horses" unless the animals are incapable of carrying their weight.

Consolidating a Key Industry.

We are exceedingly pleased to learn that the business of the Bosch Magneto Co., so far as this country is concerned, has passed into British hands, the whole of the assets having been purchased by Messrs. Vickers, Ltd., who are forming a subsidiary company under the title of the British Lighting and Ignition Co. to work the business. We need hardly remind our readers that at the outbreak of war we were dependent on the enemy for almost all the magnetos required for aeroplanes and aircraft generally. So few magnetos were turned out in this country that it is perfectly true to say that there existed no such thing as a British magneto industry. It requires very little demonstration to show that the manufacture of magnetos is really a "key" industry, since without the magneto there can exist no effective motor industry. That is true only to a modified extent of the motor car trade, because there are alternative systems of ignition which would make its existence possible even though no more magnetos were made at all. The case of the aeromotor is on a different footing entirely. In the light of present knowledge we get down to the fundamental fact that without the magneto we cannot have the aeroplane. Therefore our satisfaction at knowing that now and for the future—largely, no doubt, due to the way in which in the meantime the business has been held together—we have yet another assured source from which to fill all our wants in this direction, can be appreciated. The more of these key industries we can capture and consolidate now the better for us later on and the worse for Germany, provided we take care that the British product is as good or better than the one we were used to depend upon Germany for. We have no fear on that score.

Messines Ridge, which has been published as a general order of the day, Field-Marshal Sir Douglas Haig says:—

"I desire to place on record here my deep appreciation of the splendid work done above and below ground, as well as in the air, by all arms, services and departments, and by the Commander and staffs, by whom, under Sir Herbert Plumer's orders, all means at our disposal were combined both in preparation and in execution with a skill, devotion and bravery beyond all praise.

"The great success gained has brought a long step nearer the final victorious end of the war, and the Empire will be justly proud of the troops who have added such fresh lustre to its arms."

President Wilson to Ask for 120 Millions.

ADVICES from Washington state that President Wilson is to ask Congress for an appropriation—which may amount to £120,000,000—for the building of aeroplanes to meet the insistent demand now being made in the States for the creation of a flying corps superior in numbers to that of any European Army. Although Congress may "balk" somewhat at the amount asked for, it is not anticipated that there will be serious opposition. There is another attempt being made to secure a Department of Aeronautics. At present aviation is a branch of the Signal Corps of the U.S. Army.

CONSTRUCTIONAL DETAILS.—XVIII.*

As regards the actual mounting, *i.e.* the design of engine bearers, there is fundamentally little difference between those of the vertical and those of the Vee type. Both are as a rule fitted with lugs or flanges on the side of the crank case, designed to rest on two longitudinal members, generally made of wood. The main considerations that have to be taken into account are practically the same for both types of engines, and as these were dealt with in our last instalment of Constructional Details it is unnecessary to repeat them here. Suffice it to say that broadly speaking the problem resolves itself into providing for two main loads—the weight of the engine and the thrust of the airscrew. These two loads have to be transmitted to the body of the aeroplane *via* the structure constituting the engine mounting.

When dealing with the mounting of vertical water-cooled engines, we pointed out that although nearly all the different designs had this in common that the brackets or flanges on the sides of the crank case rested on two longitudinal bearers of wood—usually ash—there were a number of different ways of transmitting the load from the longitudinal bearers to the body structure proper. Some makers, it may be remembered, supported the engine bearers at the two ends only—in other words, employed a form of two-point suspension for each bearer; while others use three or four points of support. The question of the number of supports to employ will, of course, depend largely on the size of the engine. Thus, for instance, a long vertical engine of, say, eight cylinders, is obviously in need of a greater number of supports than is a six-cylinder engine of the same type or even than an eight-cylinder Vee engine. The reason usually advanced by constructors for employing engine bearers of wood is that this material possesses a certain amount of resiliency or "give," as it is frequently termed, thus acting to a certain extent as a shock absorber tending to lessen the effect of vibration before it reaches the body of the aeroplane. That it is possible to employ metal for these members is evidenced from the fact that the Zeppelin airship "L.33" was provided with a very elaborate structure of aluminium alloy for the mounting of the large Maybach engines. Not only the numerous supports, but the two engine bearers proper were made of this metal, and that for engines considerably longer than those usually installed in aeroplanes. However, the fact remains that most constructors favour the wood engine bearer, whether the engine be of the vertical or of the Vee type.

Our illustrations this week show three American constructors' ideas of mountings for water-cooled engines. Two of these are of the Vee type, the third being in this instance a vertical, although the Thomas firm have since then produced machines with Vee

type engines, the general arrangement of the mounting and housing being similar to that shown.

In the Curtiss biplane the "two-point" suspension has, it will be noticed, been employed. The engine mounted in this manner was a Curtiss 100 h.p. Vee, 8 cylinders. It was therefore a comparatively light and short engine, and the two supports were, we believe, found to be quite adequate in practice. The front support takes the form of a steel plate having openings formed for lightness, the edges of which are turned in to stiffen the plate against buckling. At the rear the two engine bearers rest on a transverse member, which is, in turn, secured to the upright body struts. Each bearer is clamped to the transverse beam by two U bolts, as shown in the sketch. As the engine is overhung in regard to the front chassis struts, the bracing of the sides of the *fuselage* necessarily has to be sufficiently strong to withstand landing shocks, &c. To this end, it will be noticed, the wiring of the front bays is in duplicate, individual wires being of a heavy gauge.

The mounting of the Thomas engine is very similar to that of the Curtiss, except that the front support takes the form of a single transverse member joining the lower corners of the *fuselage*, instead of the steel plate fitted on the Curtiss. In the Thomas a skid type of undercarriage is fitted, the front struts of which are attached to the lower longitudinals of the body at a point approximately in line with the centre of the engine, which cannot therefore be considered overhung like that of the Curtiss. It is probably for that reason that only single wire bracing is employed in the front bays of the Thomas.

The sketches at the bottom of our page of illustrations this week show the engine mounting of the all-steel Sturtevant biplane. In this, it will be observed, although the machine itself is built of steel throughout, the engine bearers are of ash, but the members supporting the bearers are of channel steel. Four supports carry each bearer, three running to one point, *i.e.*, the point of attachment of the chassis struts to the lower *longerons* of the body. The fourth support consists of two members running to the top and bottom rails respectively. In addition to their forward slope the channel steel supports have a lateral inclination, thus effecting a very rigid bracing of the engine in every direction.

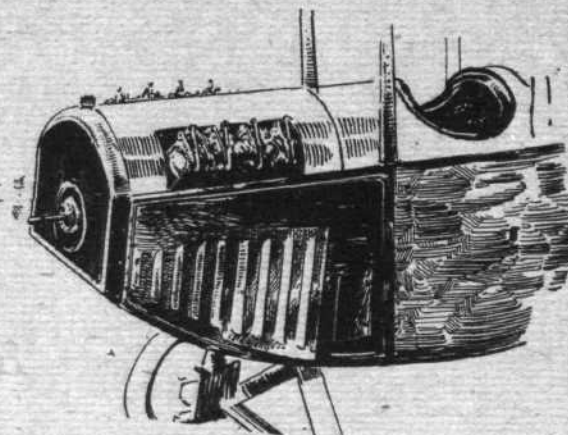
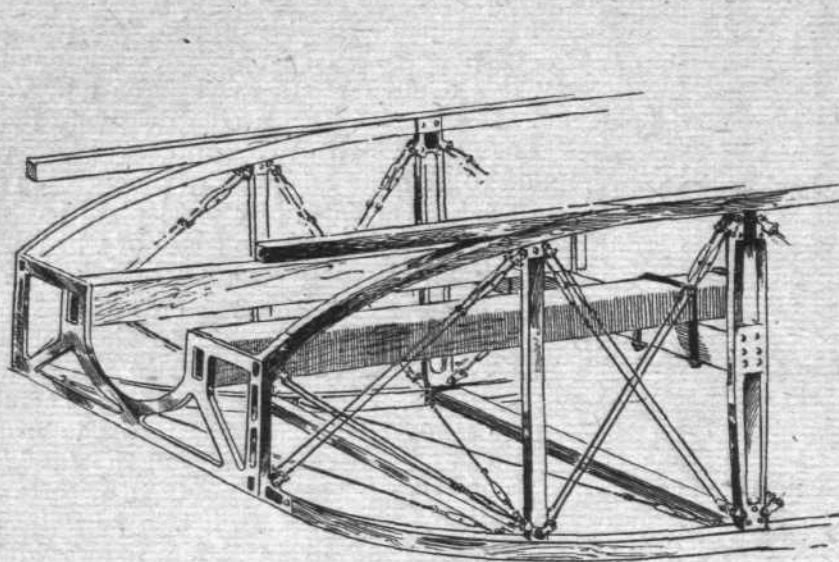
As regards the housing of water-cooled Vee type engines, this is generally very similar to that of engines of the vertical type, with the exception, of course, that the cylinder heads, instead of projecting through the engine housing in the centre of the machine, occur near the top body rails. This, for instance, is the case with the Curtiss. The exhaust pipes, which are not shown in the sketch, may be taken either upwards clear of the centre section of the top plane, or along the sides of the body, or again, as is sometimes done, they may be bent down and back, carrying the exhaust gases away underneath the bottom plane. As the engine is of the Vee type and therefore necessitates a rather wide body, the logical arrangement of the radiator is right in the nose, where, as will be seen, it has, as a matter of fact, been mounted in the Curtiss. The amount of surface thus presented normal to the wind is, of course, considerable, but in order to obtain the requisite cooling effect some surface—and that is merely another way of saying some head resistance—

* Previous sets of sketches in this series have appeared as follows:—

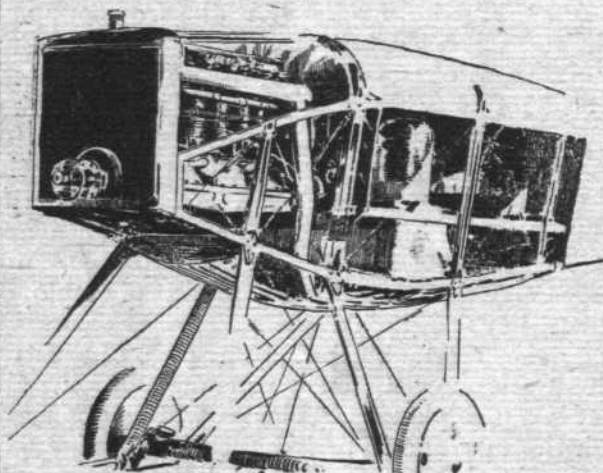
1915.		1915.	
Strut sockets	Sep. 10	Wheel undercarriages ..	Nov. 19
" "	" 17	1916.	
" "	" 24	Engine mountings ..	Jan. 9
" connections, &c. ..	Oct. 1	" "	Apl. 27
Wing spar sections ..	" 8	" "	June 8
Streamline strut sections	" 15	" "	Sept. 14
Double-skid undercarriages	" 22	" "	Dec. 21
Single " "	" 29	1917.	
Vee type undercarriages	Nov. 5	" "	June 7
" "	" 12		

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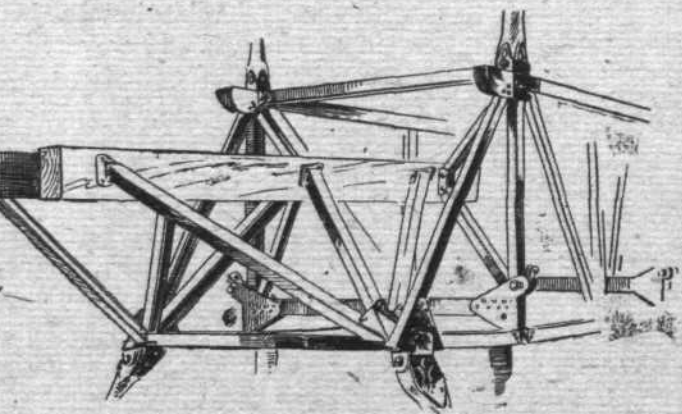
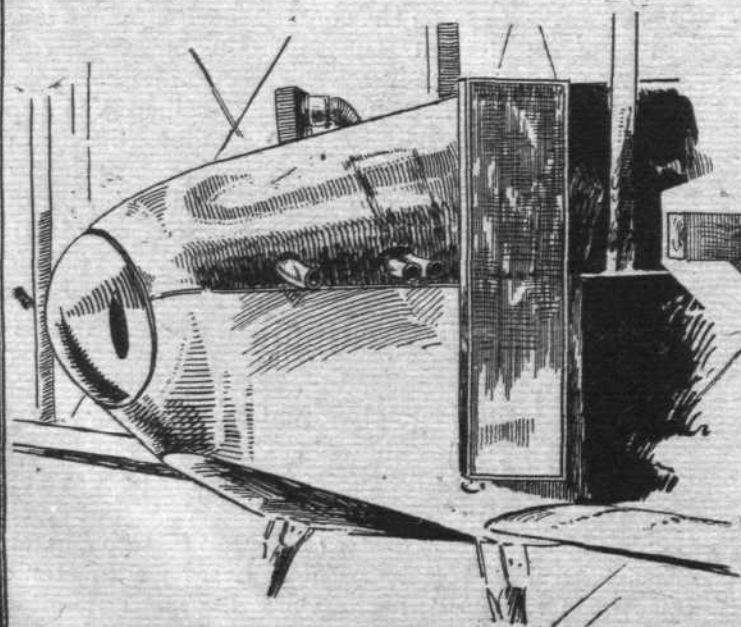
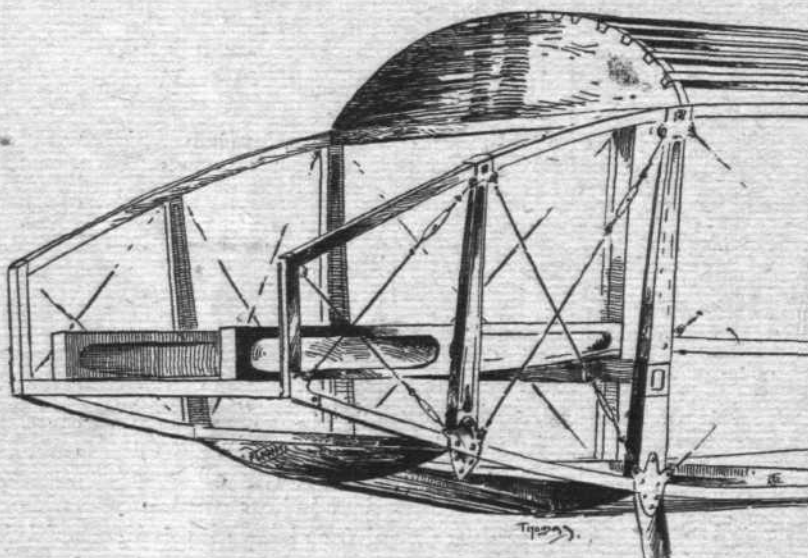
CONSTRUCTIONAL DETAILS.—XVIII.



CURTISS



THOMAS



STURTEVANT

Mounting and housing of water-cooled engines.

must be caused, and probably everything considered, this arrangement is as good as any. It certainly has the advantage of compactness and provides a neat finished appearance.

In the Thomas also the radiator is mounted in the nose, although the engine is in this instance of the water-cooled type. Here the exhaust pipe is taken down clear of the bottom of the body, which is totally covered in, motor car fashion. In the sketch

the aluminium covering has been omitted for the sake of clearness.

On the Sturtevant battleplane the engine itself is totally covered in, short exhaust pipes projecting through openings in the engine housing. As the radiators have been mounted on the side, the body covering has been tapered towards the front, where it terminates in a hemispherical nose piece fitting over the boss of the propeller.

NATIONAL PHYSICAL LABORATORY REPORT FOR THE YEAR 1916-17.

THE Annual Meeting of the General Board of the National Physical Laboratory was held at the Laboratory on the 19th inst. The President of the Royal Society (Sir J. J. Thomson) is Chairman of the Board, and Lord Rayleigh is Chairman of the Executive Committee. In normal times a large gathering assembles at Teddington on these occasions to meet the Board and to inspect the Laboratory. Under existing circumstances it is only natural that on Tuesday last only a few visitors—specially connected with the work of the Laboratory—were present at the inspection. During the past year the Laboratory has been closely engaged—with a largely augmented staff, of whom more than one hundred are women—with a variety of researches and investigations arising out of the war, and has dealt with a greatly increased volume of test work for Government Departments. Out of the wealth of reports there are a number which are not directly interesting to readers of "FLIGHT," but we select the following, dealing with or bearing upon aeronautical work:—

On the Effect of Surface Roughness on the Heat Transmitted from Hot Bodies to Fluids Flowing over them. (Dr. Stanton and Miss Marshall.)—According to the Reynolds theory of heat transmission the heat transmitted from a hot surface to a fluid flowing over it for a given velocity of flow and difference of temperature is proportional to the frictional resistance between the fluid and the surface. Previous investigations at the Laboratory and elsewhere have fully demonstrated the truth of this theory for the cases of commercially smooth surfaces, and owing to the considerable attention which is now being devoted to increasing the efficiency of radiation of air-cooled engines, it was considered to be of importance to determine whether the considerable increase in frictional resistance which would be obtained by artificially roughening the surface would be attended by a corresponding increase in the heat transmitted. The necessity for such an experimental investigation is apparent from the consideration that the Reynolds theory is based on the convection of heat due to turbulent motion, and that in cases in which the resistance is due to eddies on a larger scale, such as those thrown off from the edges of a thin plate normal

to the current, its application may not be valid. A series of heat transmission experiments was accordingly undertaken with two brass pipes identical in all respects except that in one the internal surface was in the smooth drawn condition in which it was received and in the other the internal surface was roughened by means of a screw-cutting tool so as to form a series of sharp ridges. Water was circulated through the pipes by means of a centrifugal pump provided with suitable speed regulation so that the mean velocity of flow could be varied from 15 to 100 cms. per second. The outside of the pipe was surrounded by insulated coils of Eureka wire connected to the supply mains through variable resistance, and so arranged that the temperature of the pipe could be maintained at the desired value above the temperature of the water. The mean surface temperature of the pipe was measured by an extensometer specially designed for the purpose. For the estimation of the initial and final temperature of the water, thermojunctions in thin brass tubes were placed in the water at the extremities of the experimental length and connected to a potentiometer. The estimation of the flow of water through the pipes was obtained from a carefully calibrated meter. Observations of the frictional resistance of the pipes were made by the usual method. The investigation is not yet completed, but sufficient evidence has been obtained to demonstrate that for the degree of roughness of the pipe used the Reynolds theory can be applied for all practical purposes.

AERONAUTICS.

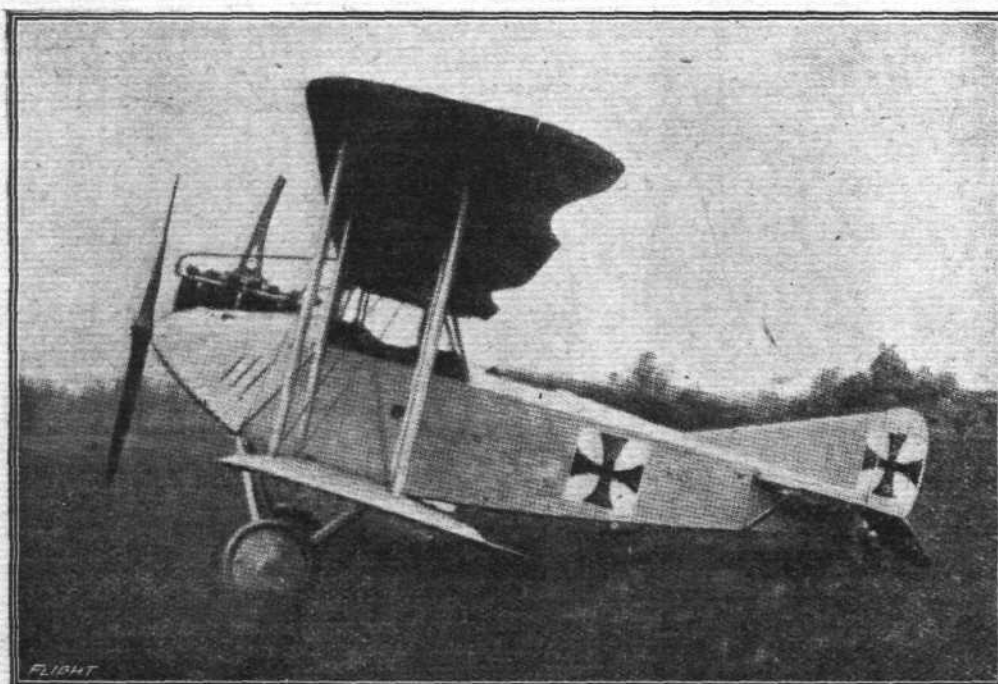
(Dr. Stanton, Mr. Bairstow, Mr. Relf, Mr. Fage, Mr. Nayler, Mr. Pannell, Mr. Stedman,* Mr. Bryant, Mr. Lavender, Mr. Irving, Mr. Cowley, Mr. Simmons, Mr. Jones, Mr. Frazer, Mr. Griffiths, Mr. Landells,† Mr. Levy, Dr. N. Campbell,‡ Mr. Collins,‡ Mr. Pell‡ and Mr. Woodford.‡)

During the year Mr. Bramwell has accepted an appointment as aeroplane designer to the Sunbeam Aviation Co., and in consequence of this has resigned from the Laboratory staff. Dr. Coales has also left the Laboratory, and is now an

* At present with the R.N.A.S. as Flight Lieutenant-Commander.

† Assisting the Admiralty as Inspector of Aeroplanes.

‡ Giving assistance as volunteers for the period of the war.



A captured German (A.E.G.) biplane with 175 h.p. Mercedes engine. Note the peculiar shape of the ailerons.—(L'Aérophile.)

Equipment Officer under the Air Board with the rank of Lieutenant. His place on the staff has been taken by Mr. Frazer.

Equipment.—The new wind channels, 4 and 7 ft. in diameter respectively, which were reported to be almost complete at the close of the last annual period, have been in continuous use for almost the whole of the current year. In both it has been found possible to obtain air speeds of 80 ft. per second with the more powerful motors installed, and the steadiness of the current is quite satisfactory when the supply is steady. In the early months difficulties were experienced from very sudden changes in the frequency of the supply voltage to the Laboratory, which caused much inconvenience. The steadiness has since been greatly improved by the supply company, and the electrical plant rendered suitable for accurate work by careful attention to the voltage regulator installed in the generator room of the Division. In the evenings the control so obtained is sufficient to render unnecessary continuous hand regulation of the air speed during an experiment.

The channels and balances of the new equipment were carefully set up independently of results obtained in the older channels. The speed standard was, as before, the standard National Physical Laboratory anemometer calibrated on the whirling arm to the nearest 0.1 per cent. on velocity. After setting up in this way, a standard wing section was tested, and the results were found to agree with those in the earlier channels. The same accuracy of agreement was found in a comparison made by the Massachusetts Institute of Technology and by the Royal Aircraft Factory, who followed National Physical Laboratory methods. The absolute accuracy of the methods appears to be established as of a high order.

New methods of test have been developed during the year in order to deal with new requests; the difficulty of the experiments called for is steadily increasing, and greater complexity in the models has made it important to consider new methods of holding them, so as to get the necessary mechanical strength without undue aerodynamical effects, which may be large unless the utmost caution is observed.

It is believed that the new methods have now been established beyond the experimental stage, and will form part of the accumulated experience of the Division.

Experiments on Airship Models.—Much work on the resistance and stability of airships has been carried out during the year, both on the non-rigid and rigid types. The results when applied in practice have proved to be very valuable, having led to the economy of time which follows from the success of the first attempt.

Work on screens for the shielding of airships has also received considerable attention. The structure of eddies is very complex, but methods have been devised whereby the necessary observations and records can be made. The more advanced results of the investigation are now becoming available and will shortly reach the stage at which a report can be made on the motion of the air in the neighbourhood of an airship shed and screen.

Further investigations have been carried out on the equilibrium of kite balloons in direct connection with their use on the full scale, and modifications have been indicated which are now commonly adopted.

Experiments on Models of Aeroplane Wings.—The work on aerofoils has covered the usual field, which includes work on new sections, the effect of combinations of planes and, in particular during this year, the aerodynamic properties of triplanes. Deformations of wing form due to the sagging of the fabric have been reproduced on a model and the variation of wing characteristics dependent on such deformations has been determined.

Experiments on complete Models of Aeroplanes and Sea-planes.—The results in the seven foot channels have proved that the increased scale and speeds made available do not lead to appreciably different results from those obtained in the smaller channels. The advantages of a larger section of channel are considerable in dealing with complete model aeroplanes as the mechanical accuracy of construction can be carried to further length.

The number of tests on complete models has again been considerable, and recently two very accurate and complete models have been constructed, one at the National Physical Laboratory, and the other at the Royal Aircraft Factory, on

which work will continue for comparison with full scale observation of stability and performance.

The results so obtained are also useful for the calculation of the motion of an aeroplane when manœuvring or when looping, conditions in which the aerodynamical conditions react directly on the stress problems connected with aeronautics. General methods of dealing with the strengths of aeroplanes and propellers come up for consideration from time to time and where necessary the calculations are supplemented by additional experiments directed towards the determination of the forces acting. The conditions of flight are continually changing and are accompanied by fresh problems requiring solution.

Test on Aeroplane Bodies.—The experiments under this head refer more particularly to the body as forming part of the whole aeroplane structure. The conditions of shape are fixed partly by aerodynamical considerations but on the whole more by the size of engine employed. The increase of resistance of the body due to the slip stream from the propeller is important, and for both pusher and tractor types has been made the subject of direct experiment.

Stability.—In this section very little new ground has been broken, but the applications and detailed analysis have received much attention. Some work has been carried out on the stability of kites and kite balloons in addition to that on airships which has already been referred to.

Propellers.—A number of propellers have been tested during the year, mostly in a wind channel, but occasionally on the whirling arm. The subject of the airflow round a propeller has been investigated from the point of view of design, and the investigation has led to an addition to the theory of design which is expected to ensure greater certainty in producing a propeller which is suitable for a special purpose. The work has given an explanation of a large part of the empirical design factors which have been used in the past. The theory in its new form has a direct bearing on the problem of the helicopter, and shows reason for large errors in applying the older methods of calculation to the problem of direct lift.

Special Investigations.—During the year an analysis has been made of the performance of aeroplanes as measured by tests on the full scale. The conclusions reached are of very direct practical application, and it is hoped that they will lead to improved performance by directing attention to the salient features of importance in the design of a modern aeroplane.

Calculations have been made of the trajectories of aerial bombs, and the experiments on radiators have been continued.

Alloys Research.—To a large extent, the work on aluminium alloys, which has been carried on throughout the year with the greatest possible energy, has been devoted to the immediate practical requirements of aircraft construction. A very large amount of work has been carried out and a long list of reports on a number of points of first-rate importance has been submitted, in the first place to the Advisory Committee on Aeronautics and to the various Admiralty and Army authorities concerned with aircraft construction. More recently the Advisory Committee on Aeronautics has formed a Sub-Committee to deal with light alloys, and on this Sub-Committee the Laboratory is represented by the Superintendent of this Department. The work of this Sub-Committee is already making itself felt in a considerable increase in the amount and urgency of the work required of the Department in connection with light alloys. At the same time it is gratifying to find that a considerable number of these results, thanks to the activity of the Sub-Committee and the representatives of the Air Board upon it, are finding immediate translation into practice. The work of the Department in this connection may, therefore, reasonably claim to have assisted to a material extent in the development of the very marked improvements, particularly in aeronautical engines, which have been achieved during recent months.

During the year there has also been a marked revival in connection with those aspects of work on light alloys which have been carried on under the auspices of the Alloys Research Committee of the Institution of Mechanical Engineers. Much of this work overlaps and interlocks with the work required for immediate aircraft purposes, but, thanks to the grants from the Alloys Research Committee of the Institution of Mechanical Engineers, and, through them, from the Industrial Research Department, it has been possible to investigate a number of matters of broad and fundamental interest in connection with the whole question of aluminium alloys and their future use and development.

Boelcke's Vanquisher in New York.

A MESSAGE from New York states that Capt. Bonnell, an American flying officer, who is credited with having killed

Capt. Boelcke, the crack German airman, has assumed charge of recruiting for the British aviation service. It is stated that 843 men were enlisted in the first week.

HONOURS.

Honours for the R.F.C.

It was announced in the *London Gazette* on June 18th that His Majesty the King has been graciously pleased to approve of the appointment of the following officer to be Companion of the Distinguished Service Order in recognition of his gallantry and devotion to duty in the field :—

Capt. W. A. BISHOP, Can. Cav. and R.F.C.—While in a single-seater he attacked three hostile machines, two of which he brought down, although in the meantime he was himself attacked by four other hostile machines. His courage and determination have set a fine example to others.

His Majesty the King has been graciously pleased to award a Bar to the Military Cross to the following officer :—

Temp. 2nd Lt. C. T. CLEAVER, M.C., Gen. List and R.F.C.—When flying at a low altitude, on reconnaissance patrol, he was wounded in the arm. He continued flying for some time, gaining most valuable information. On landing he insisted on being taken to Headquarters to impart the results of his reconnaissance. (M.C. gazetted October 20th, 1916.)

His Majesty the King has been graciously pleased to confer the Military Cross on the following officers in recognition of their gallantry and devotion to duty in the field :—

2nd Lt. D. J. BELL, R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty when in command of a long-distance bomb raid. Owing to his good leadership and skill a large ammunition dump was destroyed. Later, he single-handed carried out a difficult mission, and succeeded in reaching his objective under extremely adverse weather conditions.

Temp. 2nd Lt. (Temp. Capt.) B. ST. JOHN BOULTBEE, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty while on contact patrol. He descended to a height of 400 ft. and attacked a large party of the enemy. He subsequently effected a safe landing, in spite of very adverse weather conditions. He has on many previous occasions done fine work.

2nd Lt. E. S. T. COLE, R.F.C., Spec. Res.—On one occasion he, in a scout, attacked and brought down an enemy two-seater biplane. He has brought down two hostile balloons. He has at all times set a splendid example of courage and initiative.

Temp. 2nd Lt. H. E. DAVIS, Gen. List and R.F.C.—He carried out a valuable reconnaissance of the enemy lines, flying for half an hour at a height of 500 ft. Although attacked by five hostile machines, he succeeded in completing his task, effecting a safe landing. He was himself badly burnt, but rendered a valuable report.

Temp. 2nd Lt. H. G. DOWNING, Gen. List and R.F.C.—For consistent skill and gallantry as an observer. On one occasion when on patrol, by holding his fire until within very short range and by skilful co-operation with his pilot, he succeeded in shooting down two hostile machines.

Temp. 2nd Lt. H. E. K. ECCLES, Gen. List and R.F.C.—He has shown great skill and gallantry in carrying out night

raids on the enemy lines. He has also caused material damage to enemy railways while flying at a low altitude.

Temp. 2nd Lt. A. C. HEAVEN, Gen. List and R.F.C.—For conspicuous gallantry and devotion to duty when acting as an observer. On one occasion, when his pilot was wounded, he steered the machine back, and, landing in front of our front lines, he assisted his pilot into a shell hole, and eventually into our own trenches, under continuous rifle fire.

2nd Lt. (Temp. Capt.) N. G. McNAUGHTON, Gen. List and R.F.C., Spec. Res.—For conspicuous gallantry and devotion to duty when acting as patrol leader in numerous combats. On one occasion he led his formation against an enemy patrol, and himself drove down two hostile machines. He has set a fine example of courage and skilful leadership.

Temp. Lt. T. G. POLAND, E. Surr. R. and R.F.C.—He has frequently shown great courage and initiative in attacking the enemy on the ground with machine-gun fire. To carry out this work, he has often flown at very low altitudes, and his machine has been under very heavy machine-gun and rifle fire.

Lt. (Temp. Capt.) B. C. RICE, Gen. List and R.F.C.—While flying at a low altitude he located several enemy batteries. He was attacked by enemy machines, and although under heavy fire from the ground succeeded in driving them off. He has on numerous occasions obtained the most valuable information.

Temp. Capt. G. S. SANSON, R.F.C., Spec. Res.—Although attacked three times by hostile aircraft, he remained in the air with his balloon at its maximum height, and completed his task. He has on many previous occasions done fine work.

Lt. V. H. HUSTON, Can. A.S.C. and R.F.C.—He has rendered valuable service when on photographic reconnaissance. He has always shown the greatest skill and courage in leading attacks on hostile machines, and thus enabling valuable photographs to be secured behind the lines.

His Majesty the King has been graciously pleased to approve of the award of the Distinguished Conduct Medal to the following for acts of gallantry and devotion to duty in the field :—

24107 Flight Sergt. G. G. L. BLAKE, R.F.C.
65935 2nd Air-Mech. L. H. EMSDEN, R.F.C.

His Majesty the King has been graciously pleased to award the Military Medal for bravery in the field to the following :—

8254 Corpl. J. ROSS, R.F.C.

His Majesty the King has been graciously pleased to award the Meritorious Service Medal to the following in recognition of valuable services rendered with the Armies in the field during the present war :—

2197 Flight Sergt. F. BATTY, R.F.C.
3036 Tech. S/M. L. E. HUBER, R.F.C.

R.N.A.S. Work in East Africa.

A SUPPLEMENT to the *London Gazette*, issued on June 15th, contains a despatch from Rear-Admiral E. Charlton, Commander-in-Chief, Cape of Good Hope Station, describing the operations on the coast of German East Africa carried out by his squadron in August and September, 1916.

The following incident took place at the taking of Bagamoyo on August 15th :—

"At 6.30 a.m. it was reported from three sources—kite balloon, portable W./T., set ashore, and W./T. from seaplane—that the enemy were retiring between the French Mission and the sea, and were around the Mission.

The following officers and men are mentioned in Admiral Charlton's despatch :—

Flight-Lieut. E. R. MOON, R.N.A.S.

Flight-Lieut. J. E. B. MACLEAN, R.N.A.S.

C.P.O. (C.) J. NOONAN, R.N.A.S. (M. 2345, Po.).

1st Gr. Air-Mech. F. WILMSHURST, R.N.A.S. (J. 29563 Po.).

The following awards have been made in recognition of work in East Africa :—

Distinguished Service Order.

Flight-Lieut. E. R. MOON, R.N.A.S. (now prisoner of war).—Since April, 1916, has carried out constant flights over the enemy's coasts, including reconnaissances, bomb-dropping and spotting for gunfire in all weathers. Has shown great coolness and resource on all occasions.

Distinguished Service Cross.

Flight-Lieut. J. E. B. MACLEAN, R.N.A.S.—Since April, 1916, has carried out constant flights over the enemy's coast, including reconnaissances, bomb-dropping and spotting; was wounded when flying over Bagamoyo.

Distinguished Service Medal.

C.P.O. (C.) J. NOONAN, R.N.A.S.

1st Gr. Air-Mech. F. WILMSHURST, R.N.A.S.

The following awards have been made to members of the Navy for their services with the East African Military Forces :—

Distinguished Service Cross.

Sqdn.-Comdr. E. R. C. NANSON, R.N.A.S.—Organised his unit with great efficiency and zeal and carried out reconnaissance work under great climatic difficulties.

Flight Sub-Lieut. L. O. BROWN.—For bravery, zeal and ability shown in many long flights over enemy territory on reconnaissance work and bomb-dropping expeditions; was repeatedly under fire.

Flight-Lieut. N. G. STEWART-DAWSON.—Carried out reconnaissance over difficult country on May 30th, 1916, when he was obliged to land in the bush.

The following officers and men have been mentioned in despatches :—

Flight-Lieut. J. ROBINSON, R.N.A.S.; Lieut. I. MACKENZIE BELLAIRS, R.N.V.R.

Air-Mech., 2nd Grade, J. H. SEAGER, F. 7818; Actg. Air-Mech., 1st Grade, A. E. LILES, F. 7811.

THE ROLL OF HONOUR.

Reported by the Admiralty:—

Killed.

F 17635 Aircraftmn. 2nd Grade A. L. Shepard, R.N.A.S.

Previously reported Missing, now Unofficially reported Killed.

Flight Sub-Lieut. O. B. Ellis, R.N.

Died of Wounds.

Prob. Fl. Officer Kenneth Stuart, R.N.

Accidentally Killed.

Prob. Flight Officer W. G. Parry, R.N.

Flight Sub-Lieut. T. R. Shearer, R.N.

Died of Injuries (Accidental).

F 21467 Aircraftmn. 2nd Grade W. Creasy, R.N.A.S.]

Accidentally Injured.

Flight Lieut. J. P. Coleman, R.N.

Prob. Flight Officer A. Howard, R.N.

Missing.

Flight Sub-Lieut. L. F. W. Smith, R.N.

Reported by the War Office:—

Killed.

2nd Lieut. E. E. Arbery, R.F.C.

2nd Lieut. G. R. Bottomley, R.F.A. and R.F.C.

2nd Lieut. A. L. Cumming, R.F.C.

2nd Lieut. C. L. Green, Essex, att'd. R.F.C.

Lieut. G. A. Griffiths, Welsh, att'd. R.F.C.

2nd Lieut. M. F. J. Halliday, Gloucester, att'd. R.F.C.

2nd Lieut. R. M. Harris, Yorks., att'd. R.F.C.

Capt. H. Jackson, R.F.C.

2nd Lieut. T. C. S. MacGregor, High. L.I., att'd. R.F.C.

2nd Lieut. R. W. Spooner, R.F.C.

2nd Lieut. R. V. Williams, R.F.C.

6187 1st Air-Mech. D. L. Magee, R.F.C.

16789 2nd Air-Mech. K. Oliver, R.F.C.

25679 2nd Air-Mech. G. Pawley, R.F.C.

Died of Wounds.

2nd Lieut. G. Baines, Middlx., att'd. R.F.C.

2nd Lieut. S. H. Inglis, R.F.C.

Capt. L. P. Prior, London and R.F.C.

Lieut. W. W. Samden, R.G.A. and R.F.C.

50421 2nd Air-Mech. T. Gladman, R.F.C.

49795 2nd Air-Mech. S. J. G. Hodge, R.F.C.

Previously reported Missing, now reported Killed.

2nd Lieut. H. M. Headley, R.F.A., att'd. R.F.C.

2nd Lieut. T. Wood, R.F.C.

Accidentally Killed.

36202 2nd Air-Mech. P. M. Nell, R.F.C.

Wounded.

2nd Lieut. W. H. Bolam, K.R.R.C., att'd. R.F.C.

Lieut. L. S. Bowman, R. Lancs. and R.F.C.

Lieut. R. L. Briscoe, S. Lancs. and R.F.C.

2nd Lieut. F. P. Brown, R.F.C.

2nd Lieut. A. D. C. Browne, R.F.C.

Capt. G. Chadwick, Manch. and R.F.C.

2nd Lieut. R. E. Conder, R.F.C.

2nd Lieut. W. G. Corner, Liverpool, att'd. R.F.C.

2nd Lieut. Hon. S. H. A. D'Arcy, R.F.C.

2nd Lieut. R. M. Dixon, R. Berks., att'd. R.F.C.

2nd Lieut. J. J. Gaynor, R.F.A., att'd. R.F.C.

2nd Lieut. C. C. J. Girvan, Lancs. F., att'd. R.F.C.

2nd Lieut. T. L. Green, R.F.A., att'd. R.F.C.

2nd Lieut. W. H. Gunner, R.F.C.

2nd Lieut. E. B. Hamel, R.F.C.

2nd Lieut. R. Harrison, Hamps., att'd. R.F.C.

Lieut. F. L. B. Hebbert, R.F.A. and R.F.C.

2nd Lieut. E. H. Lascelles, K.R.R.C., att'd. R.F.C.

Capt. J. D. Latta, M.C., R.F.C.

Lieut. E. G. Leake, Manchester and R.F.C.

Lieut. G. E. Leishman, C. Ont., att'd. R.F.C.

2nd Lieut. C. F. A. Ley, Yeo. and R.F.C.

2nd Lieut. A. D. Light, R.F.C.

2nd Lieut. L. M. Mansbridge, Dorset, att'd. R.F.C.

Lieut. F. J. Martin, R.F.C.

2nd Lieut. R. C. W. Morgan, S.W. Bor., att'd. R.F.C.

2nd Lieut. L. R. Neville, R.F.C.

Lieut. P. T. Newling, R.F.C.

2nd Lieut. E. H. Penberthy, London and R.F.C.

2nd Lieut. R. A. W. Powell, Suffolk, att'd. R.F.C.

2nd Lieut. E. K. Robins, E. Surrey, att'd. R.F.C.

2nd Lieut. G. Rodgers, D. of Wells, and R.F.C.

2nd Lieut. T. W. Sclater, London and R.F.C.

2nd Lieut. W. A. Southey, R.F.C.

2nd Lieut. L. Speller, Queen's (R.W. Surrey) and R.F.C.

2nd Lieut. F. V. Wallington, M.C., R.F.C.

Lieut. H. E. Wells, R.F.A., att'd. R.F.C.

Lieut. C. E. Williamson-Jones, Manchester, att'd. R.F.C.

2nd Lieut. J. R. Wilson, R.F.C.

Wounded and Missing.

2nd Lieut. H. Z. C. Clarke, R.F.C.

Previously reported Wounded and Missing, now reported Prisoner of War in Bulgarian hands.

2nd Lieut. E. P. Hyde, Ches. and R.F.C.

Wounded and Prisoner of War in Turkish hands.

2nd Lieut. M. L. Maguire, Con. Ran., att'd. R.F.C.

Previously Missing, now reported Wounded and Prisoners of War in German hands.

2nd Lieut. A. Boldison, Lincoln, att'd. R.F.C.

Lieut. H. A. Cooper, London and R.F.C.

Lieut. H. D. K. George, R. Dub. Fus., att'd. R.F.C.

2nd Lieut. T. W. Jay, R.F.C.

2nd Lieut. A. N. Leckler, R.F.C.

Previously Prisoners of War, now reported Wounded and Prisoners of War in German hands.

2nd Lieut. J. Fairbairn, R.F.C.

Capt. O. Greig, R.F.C.

Lieut. J. Middleton, R.F.C.

Missing.

Capt. W. T. L. Allcock, R.F.C.

2nd Lieut. C. J. Baylis, R.F.C.

2nd Lieut. B. G. Chalmers, Gor. Highrs. and R.F.C.

Lieut. H. G. K. Cotterill, R.F.A., att'd. R.F.C.

Lieut. G. W. Devenish, R.F.A., att'd. R.F.C.

2nd Lieut. Count L. T. B. di Balme, R.F.C.

2nd Lieut. A. E. J. Dobson, R.F.C.

Lieut. F. S. Ferriman, O. and B. L.I., att'd. R.F.C.

2nd Lieut. G. H. Fletcher, W. Yorks., att'd. R.F.C.

2nd Lieut. F. H. Foster, R.F.C.

2nd Lieut. G. R. D. Gee, R. Sussex, att'd. R.F.C.

Lieut. E. J. Y. Grevelink, D. of Well's, att'd. R.F.C.

2nd Lieut. C. D. Grierson, Yeo. and R.F.C.

2nd Lieut. N. B. Hair, R.F.C.

2nd Lieut. E. D. Haller, R.F.C.

Lieut. H. Hamer, R.F.C.

Lieut. F. W. Harley, Bl. Watch and R.F.C.

2nd Lieut. H. Harris, R.F.C.

Lieut. D. J. Honer, R.F.A. and R.F.C.

2nd Lieut. F. W. Illingworth, Cameronians, att'd. R.F.C.

Lieut. J. B. Jackson, R. Scots, att'd. R.F.C.

2nd Lieut. E. Jacot, R.F.C.

2nd Lieut. J. C. McNamara, R.F.C.

Lieut. T. A. Methelal, Saskatchewan, att'd. R.F.C.

2nd Lieut. W. G. Millship, R.F.C.

2nd Lieut. W. J. Mussard, R.F.C.

2nd Lieut. R. M. Neill, R.F.C.

2nd Lieut. H. F. Paton, R.F.C.

Lieut. A. J. C. E. Phillippo, A.S.C., att'd. R.F.C.

Capt. R. G. H. Pixley, M.C., R.F.A. and R.F.C.

Capt. D. C. Rutter, R. Sussex, att'd. R.F.C.

Lieut. F. Sharpe, Sher. For., att'd. R.F.C.

Lieut. J. W. Shaw, R.F.C.

2nd Lieut. A. V. Shirley, Yeo. and R.F.C.

Lieut. B. Smith, Essex and R.F.C.

2nd Lieut. G. C. Stead, R.F.C.

2nd Lieut. D. T. Steeves, R.F.C.

Major C. E. Sutcliffe, Can. Inf., att'd. R.F.C.

Previously Missing, now reported Prisoners of War in German hands.

2nd Lieut. A. A. Baerlein, R.F.A., att'd. R.F.C.

Lieut. P. T. Bowers, R.F.C.

Lieut. T. F. Burrill, Yeo. and R.F.C.

2nd Lieut. J. A. Cairns, A. and S. Hrs. and R.F.C.

2nd Lieut. A. E. Fereman, Mddsx., att'd. R.F.C.

Lieut. W. N. Hamilton, R.F.C.

Capt. H. R. Hawkins, R.F.C.

2nd Lieut. E. D. Jennings, R.F.C.

2nd Lieut. C. B. Holland, R.F.C.

2nd Lieut. J. R. Lingard, Ches., att'd. R.F.C.

2nd Lieut. G. O. McEntee, R. Fusiliers, att'd. R.F.C.

Lieut. H. B. Milling, R.F.C.

Lieut. D. K. Paris, M.C., R.F.A., att'd. R.F.C.

2nd Lieut. H. J. Price, Queen's (R.W. Surrey), att'd. R.F.C.

2nd Lieut. H. S. Richards, Sher. For., att'd. R.F.C.

2nd Lieut. S. T. Wills, Nhampton., att'd. R.F.C.

Correction:

Wounded.

Lieut. R. E. Johnson, Queen's (R.W. Surrey), att'd. R.F.C.,
should read Lieut. R. E. Johnson, R.F.C.

ROYAL AERO CLUB OF THE U.K.

OFFICIAL NOTICES TO MEMBERS.

FLYING SERVICES FUND SUB-COMMITTEE.

A MEETING of the Flying Services Fund Sub-Committee was held on Monday, the 18th inst., when there were present:—Major T. O'B. Hubbard, R.F.C., in the Chair, Mr. Chester Fox, Squadron Commander C. E. Maude, R.N., and the Assistant Secretary.

Applications for Assistance.—Eight applications for assistance from the Fund were considered, and Grants and Allowances were recommended respectively:—

1. To the wife of a Leading Mechanic of the Royal Naval Air Service who had been killed on active service.
2. To the wife of a Sergeant of the Royal Flying Corps who had been killed on active service.
3. To the wife of a Leading Mechanic of the Royal Naval Air Service who had been killed on active service.
4. To the wife of a Sergeant of the Royal Flying Corps who had been killed on active service.
5. To the wife of a Sergeant of the Royal Flying Corps who had been killed on active service.
6. To the mother of a Chief Petty Officer of the Royal Naval Air Service who had been killed on active service.

Club House.

The following prices have been fixed for the present by the Committee:—

Bedroom (including Bath)	5s. each per night.
Breakfast	2s. 6d.
House Luncheon	2s. 6d.
House Dinner	3s. 6d.

Billiard Room.

The Billiard Room is now open for the use of the Members.

THE FLYING SERVICES FUND administered by THE ROYAL AERO CLUB.

THE Flying Services Fund has been instituted by the Royal Aero Club for the benefit of officers and men of the Royal Naval Air Service and the Royal Flying Corps who are incapacitated on active service, and for the widows and dependants of those who are killed.

The fund is intended for the benefit of all ranks, but especially for petty officers, non-commissioned officers and men.

Forms of application for assistance can be obtained from the Royal Aero Club, 3, Clifford Street, New Bond Street, London, W. 1.

Subscriptions.

	£	s.	d.
Total subscriptions received to June 13th, 1917	11,826	16	7
Miss E. Bairdsmith		1	10
Total, June 19th, 1917	11,827	17	7

B. STEVENSON, Assistant Secretary.

3, Clifford Street, New Bond Street, W. 1.

AMERICAN NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS REPORT.

In the absence of published reports of investigations carried out at such institutions as the British National Physical Laboratory and Mons. Eiffel's Laboratory at Auteuil during the war, the annual reports of the American National Advisory Committee for Aeronautics are looked forward to with a considerable amount of expectation by students of aeronautics, forming, as these reports do, the only available data concerning modern results of investigations pertaining to aeronautical problems. The second of these reports is just to hand, and although a rapid perusal of its pages is apt to leave one a little disappointed at first, further study of the contents of the report will show that what is lacking in variety of subjects is to a certain extent made up for by the thoroughness with which the main subject, *i.e.* that of carburettors, has been treated.

It should be pointed out that the American National Committee for Aeronautics is very considerably handicapped through not having its own national laboratory in which to carry out the various experiments, these having to be done at different institutions, notably at the Massachusetts Institute of Technology. In this connection it might be mentioned that Mr. Jerome C. Hunsaker has been appointed Assistant Naval Constructor to the United States Navy, and Prof. A. Klemin has succeeded him at the Massachusetts Institute of Technology. Mr. Hunsaker's work while he was connected with that Institute has been of a most valuable character, not only to his own country, but also on this side. Several of his reports have been published from time to time in the columns of "FLIGHT."

Briefly speaking, the Second Annual Report of the American National Advisory Committee for Aeronautics contains five technical reports, the first of which deals with the general specifications covering requirements of aeronautical instruments, and indicates the lines on which development is required, and the restrictions and difficulties to be overcome in the design and construction of aeronautical instruments. The report does not, it should be pointed out, give results of actual experiments, but should be useful to inventors and designers in indicating what to aim at and what to avoid.

The next report contains the American nomenclature for Aeronautics, which appears to tally fairly closely with that in use in this country. It is noticed that the word *airplane* has been substituted for *aeroplane*, the former word having thus been officially adopted in America. On this side, in spite of several attempts from certain quarters, the word *airplane* has failed to "catch on." The word *décalage* has

been adopted from the French to indicate an increase in the angular setting of the chord of an upper wing of a biplane in relation to the chord of the lower wing.

A preliminary report of progress in the design and construction of a suitable form of muffler for aero engines is of interest. This is a rather difficult problem, and requires a large amount of experimental work. In this preliminary report it is pointed out that there are other than exhaust noises to be contended with, even more difficult of elimination. This special report has been prepared by Professors H. Diederichs and G. B. Upton, of Cornell University, Ithaca, N.Y. As definite results have not yet been attained, experimental work and investigation will be further pursued during the present year.

As already pointed out, the main subject treated in the report deals with petrol carburettors, and occupies a matter of approximately 500 pages. This lengthy report is divided up into parts, the first of which deals with the nature of the problem and scope of carburettor design, while the second part contains a complete list of all the carburettor patents taken out in the United States. In the following parts these patents have been re-classified according to type, and re-grouped with cross references, thus greatly facilitating research, numerous illustrations taken from the patent drawings accompanying the text. The next part deals with the structural characteristics and functional operation of proportioning flow carburettors, and this is followed by a chapter treating the flow laws for gases and liquids, with special reference to air and petrol. Finally, the last part of the report records new experimental determinations of the proportioning accuracy of a selected number of typical American commercial carburettors under variations of flow conditions. This long and very valuable report, which is divided into seven parts, has been prepared by Prof. C. E. Lucke, of the Columbia University, New York City, assisted by F. O. Willhöfft, Assistant Professor of Mechanical Engineering.

As already mentioned, the Second Annual Report of the American Advisory Committee for Aeronautics makes up in thoroughness of the main subject treated for the lack of variety of problems tackled, and realising the difficulties under which it is working, one cannot but congratulate the committee on its second report. It is to be hoped that during the present year the committee will be provided with greater facilities and more generous grants in the way of appropriations to enable it to deal in a more effective manner with the numerous problems that demand immediate solution.

ANSWERS TO CORRESPONDENTS

[As a number of letters reach us signed with initials only, some of which do not give a complete address, we would point out that such communications cannot be dealt with in our columns. Full name and address, which will not be published, must always be given.—Ed.]

Notice to Correspondents in General.

Applications for commissions in the Royal Naval Air Service should be addressed to the Director of Air Services, Admiralty, S.W. The necessary form and conditions of entry can be obtained from the Secretary of the Admiralty.

Applications for commissions in the Royal Flying Corps should be sent to the Director-General of Military Aeronautics, Hotel Cecil, Strand, W.C.

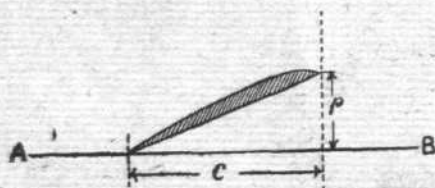
Those who wish to enlist in the R.N.A.S. should apply to the nearest naval recruiting station or to the R.N.A.S. Drafting Office, Crystal Palace, S.E. Skilled mechanics are taken whatever their army classification, but unskilled men are only taken if they are classified B1, B2, or C1.

Recruiting for the R.F.C. is closed for the time being, and any enquiries should be made to the Officer Commanding, Royal Flying Corps Depot, Farnborough.

Enquiries with regard to appointments in the A.I.D. should be addressed to the Chief Inspector, Aeronautical Inspection Department, Hotel Cecil, W.C. 2.

C. A. A. (S.W.).

As a rule air screws have their pitch stamped on the boss. When this is not the case it is a matter of some difficulty to find the pitch accurately. It may, however, be found approximately in the following manner: Place the airscrew on a plane surface, such as a table top, with the drawing face downward. The distance C, or the projected width of the blade, is a part of the circumference at the point measured, and the height P of the leading edge of the section above the base line AB is part of the pitch. The pitch is then found by the formula $P = \frac{2\pi r p}{C}$, P = pitch, in inches, r = the distance from the axis of the boss to the point measured, in inches, and C = the projected blade width, in inches, π , of course = 3.1416.



The pitch thus found is not, however, quite correct, since this method presupposes that the chord of the sections is set at no angle of incidence. In practice this is not usually so, the chord angles being generally greater than the helix angles. The accompanying diagram will illustrate our point. The lines dc, ec, fc and ac represent the helix angles, which we have called a_1, a_2, a_3, a_4 respectively. For the sake of clearness we have shown all the chord angles 3 degrees greater than the helix angles, although this does not necessarily represent general practice. As a matter of fact, there are, we believe, propellers in which, at certain points, the chord angles are actually smaller than the helix angles. The angles $A_1-a_1, A_2-a_2, A_3-a_3, A_4-a_4$ are called the angles of attack, and correspond to the angle of incidence of an aeroplane wing. In our diagram all these angles of attack are 3 degrees, but they may, as we have pointed out, vary along the blade of the airscrew. Near the boss, where the blade has a small velocity, some propellers have sections resembling a streamline shape rather than an aerofoil section, the blade being here more in the nature of a supporting arm. Consequently in that case the chord angle is the same as the helix angle.

If due allowance be made for this angle of incidence over the outer part of the blade and it is assumed that near the boss the chord angle is the same as the helix angle, the pitch may be found approximately.

E. D. G. (Ackworth).

We cannot say whether you could obtain a commission. You should apply as directed above.

M. E. G. (Erith).

Apply to the R.N.A.S. Drafting Station as directed above when you reach 18. In the meantime you should stay at your work.

A. L. C. (Twickenham).

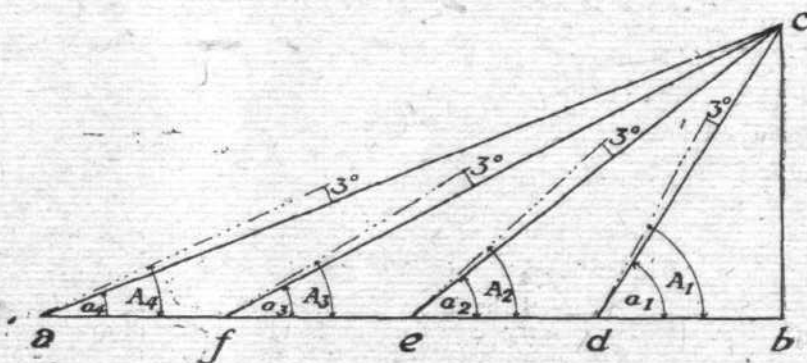
The pay of a Flight Sub-Lieutenant, R.N.A.S., is 10s. a day, plus 8s. a day flying pay. The pay of a Flying Officer, R.F.C., is 12s. a day, plus 8s. a day flying pay.

C. H. J. (Sutton Coldfield).—Judging from your sketch, the machine in question is a Maurice Farman "Shorthorn." The R.E.8 is a tractor biplane, rather large span, big extensions to the top plane, and a big dihedral angle. Planes of high aspect ratio. The Bristol bullet is a fast scouting biplane. The machine on page 483 of "FLIGHT" is a B.E.2c.

C. T. (Catford).—It is not possible from your description to say what the machines you refer to are. Probably the first mentioned was an R.E. As Gilbert's famous Morane monoplane "Le Vengeur" has been built during the war, it is not permissible to publish scale drawings of it at present. The fins on top of the upper wing of the flying boat perform the function of raising the centre of side area of the machine, thus increasing its lateral stability.

W. D. K. (Sanderstead).—So far as we know there is no easy method for judging the height of aircraft. Instruments are, of course, in existence which are designed to do this, but the rough-and-ready methods sometimes published are worse than useless unless the exact size of the aircraft is known.

G. A. M. (N.16).—It is quite possible to stop an airscrew during a flat glide. This is not, of course, usually done



deliberately, since with the majority of engines once the propeller had stopped it would not be possible to restart it. Exceptions are machines fitted with some form of starting devices, but we take it that what you refer to is starting the propeller again with the speed of the aeroplane. Where an engine has a very low compression, as in the case of some of the older rotaries, it would probably be quite possible to put the machine into a vertical dive, thus attaining a speed sufficient to restart the propeller. As a "stunt" stopping the propeller is quite a well-known performance.

1st A.M., S. T. M. (R.F.C.).—So far as we know there is no book published dealing specially with "low-power flight." This is chiefly a matter of design, and F. S. Barnwell's book, "Aeroplane Design," would probably be found useful in indicating methods of designing an aeroplane. In the first months of 1916 we published in "FLIGHT" a series of articles entitled "A Popular Type Aeroplane Design," which you would also find useful. The issues containing this article are obtainable from the offices of "FLIGHT."

B. E. (Larkhill).—For details regarding the Renault engines you could not do better than get the "Wolsley Aero Engine Manual." It can be obtained from "FLIGHT" offices for 5s. 4d. post free.

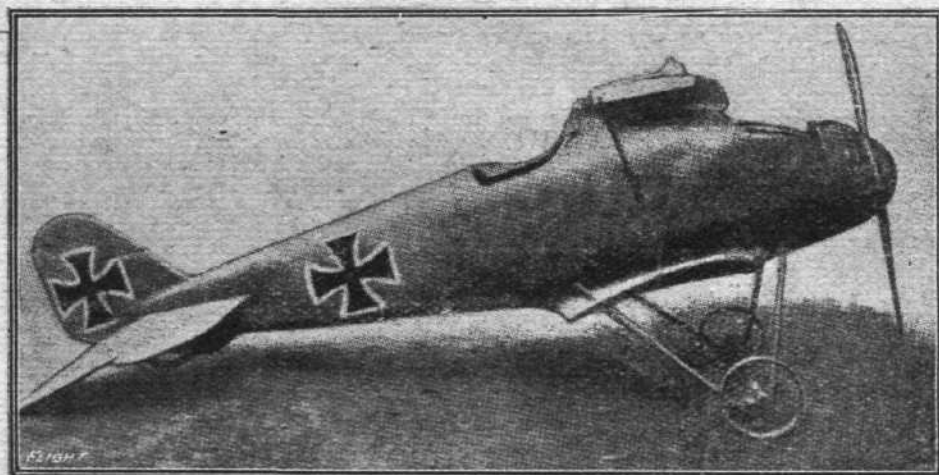
J. H. G. (Prestbury).—The N.P.L. report for the year 1912-13 containing the stress diagrams of aeroplanes can be obtained from the offices of "FLIGHT." The price is 10s. 6d. post free.

AIRISMS

FROM THE Four Winds.

ABOUT the coolest thing of the air raid on London—and things were pretty hot, both explosively and atmospherically—was the scene reported in one of the adjacent county courts.

bona-fide defence—(boom; several women ran out and then back again, shrieking)—I hope people will be quiet. If they cannot they had better leave the court."



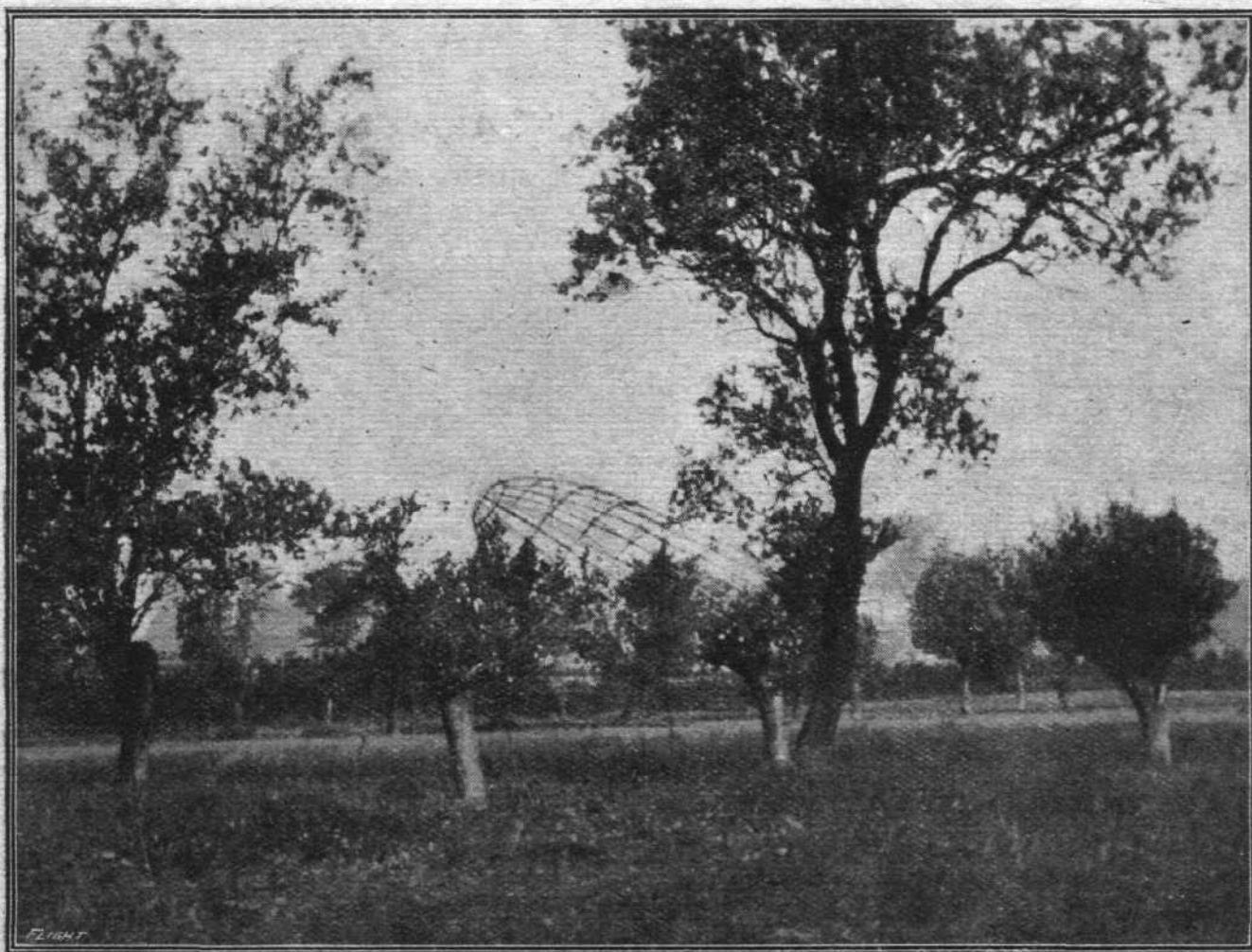
The curious body of the German Roland single-seater chaser biplane. The centre sections of the wings are left in place, and show where the planes are attached. The top plane, it will be noticed, is attached to the top of the fuselage. Note the balanced rudder and elevators.—(L'Aérophile.)

At the moment of the raid the judge was delivering judgment, and he just calmly went on:—

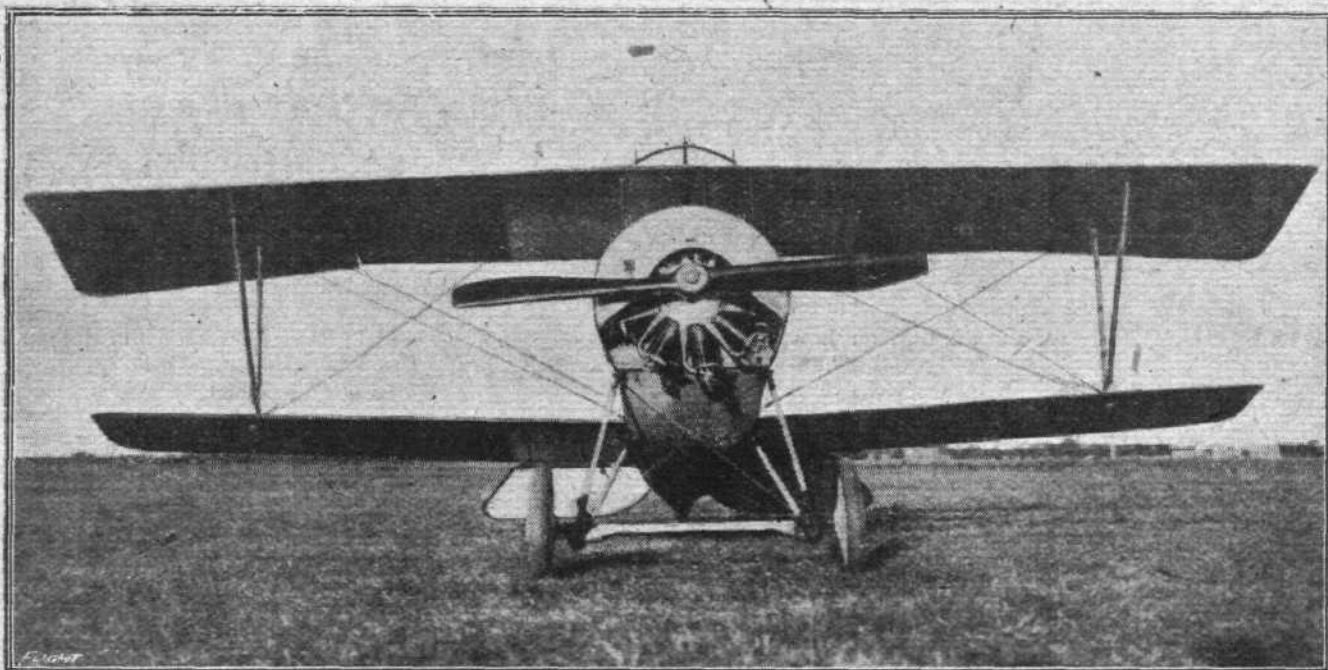
"In this contract plaintiffs have undertaken certain obligations—(boom)—which they contend have been carried out—(boom)—Defendants have set up what I think is a

Another boom, another woman's cry, but the judge finished his judgment.

PERHAPS the next coolest thing of the raid was the announcement in heavy type of the *Berliner Morgenpost*, under the



A view of part of the framework of the Zeppelin raider brought down in East Anglia on Sunday morning last by an R.F.C. pilot.



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FROM "THE WAR IN ITALY."—An Italian Nieuport biplane as seen from the front.

headline "Flight of the English Government from London," of a Dutch telegram stating that the English Government is seriously entertaining the intention of removing the seat of Government away from London owing to the continual German aeroplane attacks.

It is a quaint *sequiter* which the *Cologne Gazette* draws, in the following comment upon the attack:—

"Even from the tearful and distorted English report it can be recognised that this attack on London was one of the heaviest which ever took place, and that, consequently, also the military damage, which the English naturally keep secret, must have been tremendous."

If the rest of the "facts" upon which the German press and public are spoon-fed, concerning the results of their piratical adventures are of the same calibre, no wonder they are induced by the Junkers to hold on with heroic fortitude and desperation to the hope—or as it appears to them, the certainty—of the early physical, moral and economic collapse of muchly Gott-strafed England.

WARNINGS; to be, or not to be?

If the Lord Mayor, without proper Government authority, does have the bells of St. Paul's rung as a raid warning to the

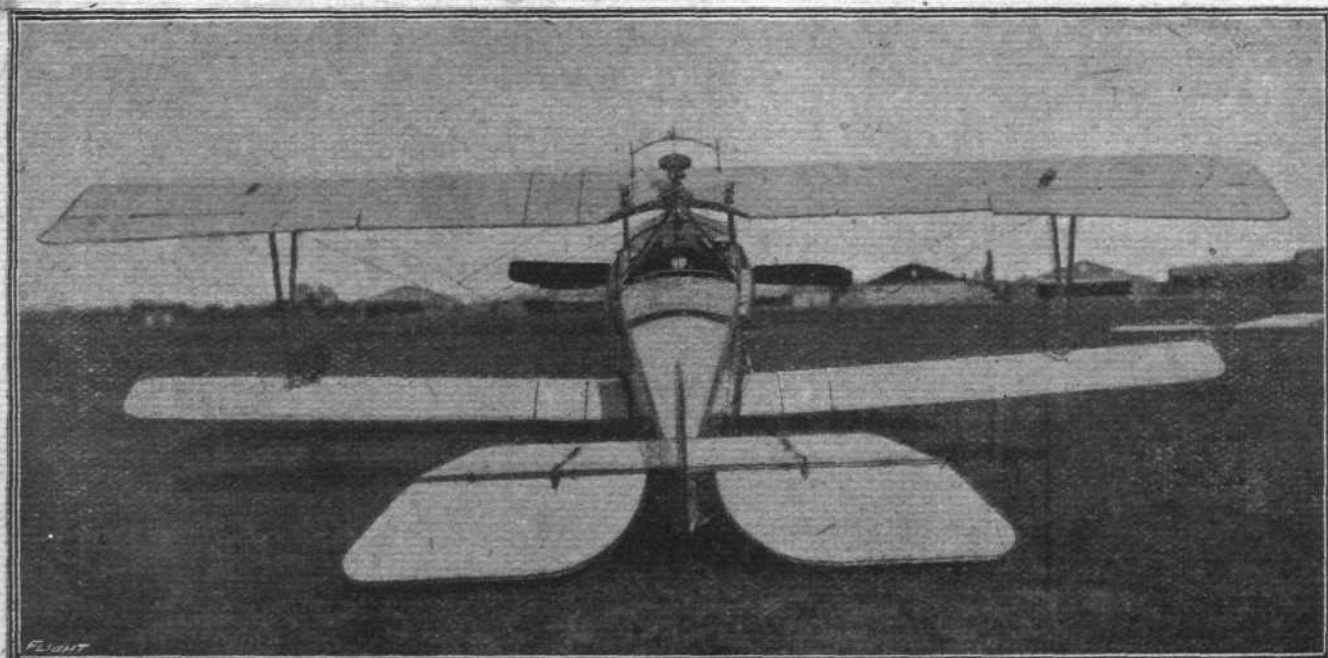
people of the City, we wonder how he will reconcile his legal duties as Chief Magistrate and as Citizen. There are some funny little clauses buried in all sorts of odd corners of the Defence of the Realm Act.

QUEEN ALEXANDRA is, as usual, to the fore where real distress exists. Her Majesty's name for £100 was one of the first to go down on the Lord Mayor's Fund for relief to those suffering by the raid.

MANY a worse form of reprisal might be indulged in than that suggested by a "City Merchant," a correspondent of the *Observer*. His contribution to the reprisal campaign is as follows:—

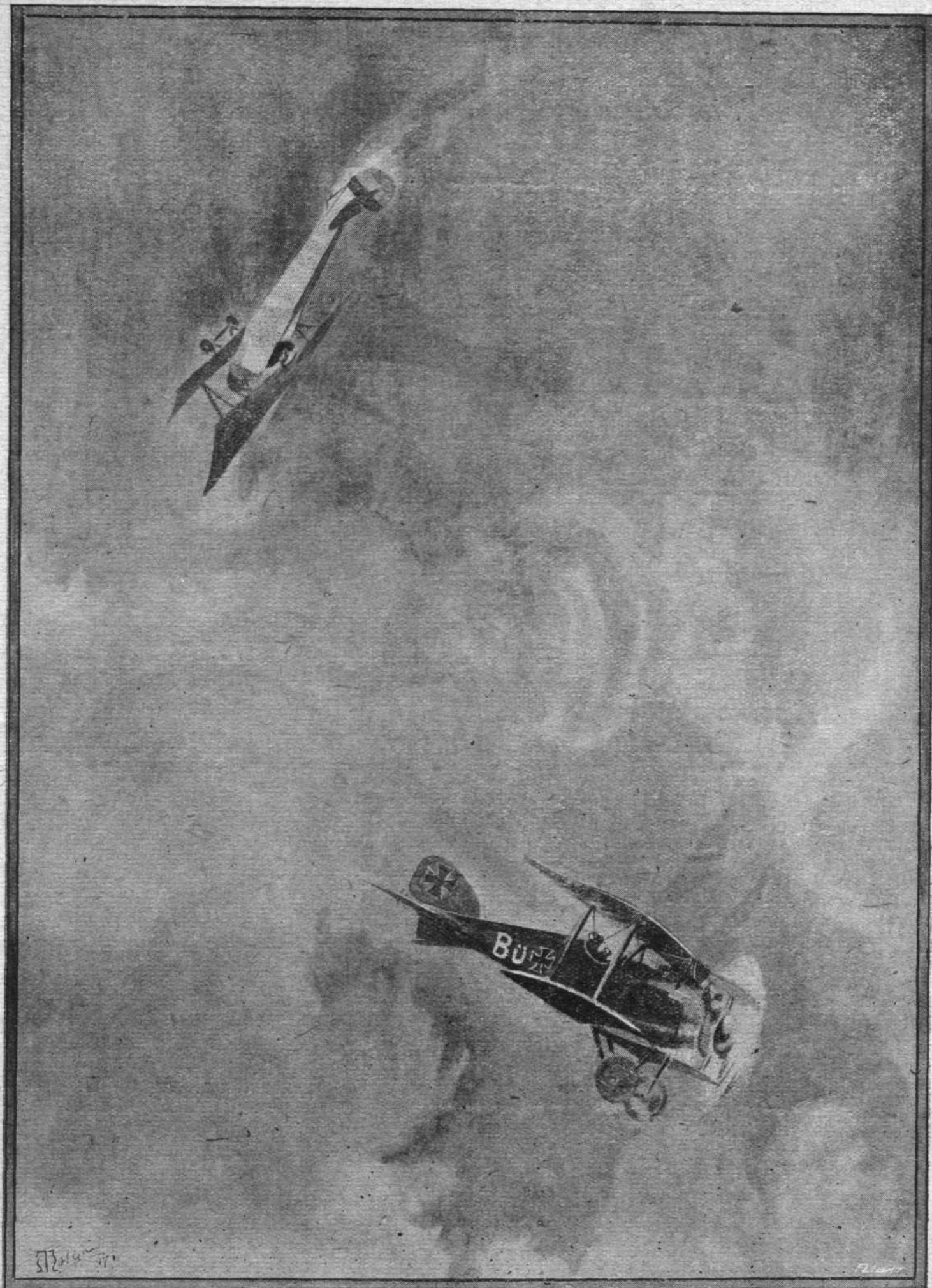
"If business is to be carried on effectively in the City it must be protected from disturbance by frequent air raids. As a practical proposal the City suggests that the Government take the top floor of Liverpool Street Hotel, Cannon Street Hotel, and other prominent hotels in the neighbourhood of the City and convert them into temporary prisons for the German officers who are now at Donington Hall."

Why not? There are one or two quite nice young Huns amongst the Donington incarcerated.



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FROM "THE WAR IN ITALY."—An Italian Nieuport biplane from the back.



"THE NAVY-THAT-FLIES."—When he was about 150 yards behind me I looked straight over him, and coming out of the loop dived at him and fired a good long burst."

OFFICIALDOM and bureaucracy these days are in their zenith. The following items concerned with the recent Folkestone raid are gems of the first water:—

"Two photographers on the staff of a London paper were summoned at Folkestone for taking photographs of injured in hospital after the air raid without permission. They were bound over. Lady Watkin was fined 20s. for being in possession of a camera without a permit. A special constable saw her take a photograph of houses smashed by the bombs."

A few years back, in the early days of the war, we ventured the opinion that when the mark was at 50 per cent. discount, would be about the time to think that there was a fairly remote chance of a real peace being a bit nearer. This week the precious Hun coin has, at 65 francs, got very close to this given-away-with-a-pound-of-tea value, and it looks uncommonly like the beginning of a scramble by the Hunnish banking world to save a bit of their commitments with the German Government before they are individually and collectively cleaned out. They'll have to hustle, though, now to get clear in time of the financial wreckage which is looming large on the Central Powers' horizon. Austria-Hungary is long past even the saving stage, as her kroner is careering around somewhere approaching 66 per cent. discount. A really effective and continuous reprisal policy on our part should very quickly knock what little bottom there is still left in either token, completely out. The rats have for some little time now commenced leaving the ship, and it cannot now be long before the fleeced and deluded German nation realises the position.

AND the most delightful part of the whole business is that the financial aftermath will be even more disastrous to the Germans, as they will find the whole of their industrious and laborious efforts for the best part of a century to obtain and keep control of the commerce of the world have been entirely annihilated, and they will have to commence again where they started about a hundred years ago. Well may the *Vorwaerts* cry out in lamentation: "The best means against the further depreciation of the mark is a speedy peace."

As a natural side-issue of the aerial services which are already in being in Italy between Rome and Turin, a special stamp has been issued by the Italian Post Office, for use on letters intended to be conveyed by aeroplane. This is the ordinary Italian "express letter" stamp, 25 centesimi rose, overprinted in black "Esperimento Posta Aerea, Maggio 1917. Torino-Roma. Roma-Torino." This is, we believe, the first Governmental postage stamp issued for an aerial mail service. A similar stamp will also soon be available in connection with the experimental post being tried between the Italian mainland and Sardinia during the continuance of the U-boat menace. In this service Flight Lieut. Fusconi is the pilot of the seaplane and his time about 1½ hours.

"Blic" stands for the all-British magneto which is now being turned out in thousands by the British Lighting and Ignition Co. With Messrs. Vickers, Ltd., in complete control of this new "key" undertaking, the upholders of the old country may well take heart for the future. "Blic" is the quintessence of "Bosch," whose follower it is, "Blic" having become the substance, whilst "Bosch" has become but the shadow, to fade away we hope, so far as Britain is concerned, into the *Ewigkeit*.

Looks as if Sweden *might* be looking forward to developments, since she has thought fit amongst other things, to prohibit for exportation to all countries "flying machines, airships, balloons and parts thereof."

REAR-ADMIRAL ROBERT PEARY, of the U.S. Navy, is encouraging in his ideas of the numbers of aeroplanes to be sent over to help along at the front. His views, which it looks as if the Senate is likely to adopt, are that thousands should be sent over as speedily as possible "with the same concentration as that exercised by Von Tirpitz in his submarine campaign." We hope even more so, and as there are rumours up to a cool "hundred thousand"—why it looks as if by the spring we really may be able to do the Huns down in the air, permanently.

FROM Italy comes a little protest in regard to a recent quotation in "FLIGHT" from a *Daily Telegraph* article. Tenente A. Gasparinetti, of 43A, Squadriglia Aeroplani, in the war zone, is the protestor, and we willingly give him space for his courteous correction:—

"In the No. 439 of 'FLIGHT,' p. 513, where is reported an article of the *Daily Telegraph*, is stated that Italian aeroplanes are piloted by ex-chauffeurs. I desire now inform the correspondent of the *Daily Telegraph* that ours R.F.C. are like to the British R.F.C., and in both he may find gentlemen of the best aristocracy and also ex-chauffeurs.

"If you like to publish the above, you can do it."

A FEW months ago, says the *Liverpool Courier*, we mentioned as a shining example of patriotism the case of a Southport young man who travelled all the way from Siberia, where he gave up a good position, in order to enlist. He is now qualifying in the Flying Corps, and has just been home to Southport on a few days' leave. He tells of an incident during a flight that is probably unique. While flying across country he descended near a farmhouse, where he was given half a dozen eggs, which he put carefully into the machine. He then resumed his flight, and just as he was about to descend at the end of the journey something went wrong and the machine began to fall. Quickly unstrapping himself he jumped out as it neared the ground and escaped unhurt. Both wings of the aeroplane were smashed, and it sustained



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From "The War in Italy."—An Italian Nieuport biplane.

other damage. But when he came to examine it he found the eggs uninjured.

SOME eggs those. But perhaps after all the kindly farmer soul had with commendable forethought hard-boiled her gift.

Is it possible that the German peoples *really* believe that everything "English" is of the vilest and most depraved, and *per contra* that whatsoever emanates from the Hunnish brain must, *ipso facto*, be of virgin purity? There must be some grounds for this very remarkable state of things, as so many instances are in evidence in which it is difficult not to accept the *bona fides* of the person putting forward such benign platitudes. Take, for instance, this picture of the gentle Hun as he appears to Major Siegert, Inspector of Flying Forces. When speaking of German pilots at a meeting in Berlin the other day, this student of his brother pilots depicted them as the "masters of the air" above both land and sea, and as paragons of humanity who, "with touching piety notify the enemy when one of his airmen is shot down, drop a parachute with the fallen enemy's personal effects over his own lines, and, if possible, send a photograph of his last resting-place to his bereaved family."

SWITCHING over to the other side, the Major continued:—

"Though undoubtedly daring and extraordinarily tenacious, the English have grown so rowdyish through sport that they are not filled with any sense of the terribly deep meaning of war. They look upon it merely as a thrilling change from football or boxing. It has even happened that an English airman will challenge us to a duel, asking us to meet in the air at a certain place and time, armed only with one machine-gun, and fight to a finish."

TEN YEARS AGO.

Excerpts from the "Auto." ("FLIGHT's" precursor and sister journal) of June, 1907. "FLIGHT" was founded in 1908.

SANTOS DUMONT'S "No. 16."

Whether M. Santos Dumont's latest idea in airships is a balloon with an aeroplane attachment, or whether it is an aeroplane with a balloon attachment, has up to now been somewhat in question, for the French, who are adepts at using



"With Botha and Smuts in Africa."

ALTHOUGH the book which Lieut.-Commander Whittall has written under the above title has nothing to do with aviation, the fact that it records the doings of one of the armoured car squadrons formed by the Royal Naval Air Service will, apart from the absorbing interest of the book itself, commend it to many. There is only one reference to aeroplanes in the book, and that is where it is recorded that a German observer on sighting the armoured cars for the first time reported them as "water-carts." How far he was out in his observation his friends discovered two days later when those "water-carts" rendered most effective assistance in repelling an attack.

The author has, however, a very vivid story to tell of the work of the motor cars first in South-West Africa and later in East Africa. In the former place sand was almost as great an enemy as the Hun, and it seems astonishing that the cars surmounted some of the difficulties. In many instances the capabilities of the cars were discovered accidentally, as when, for instance, one of the cars was, by a misunderstanding, driven across a dry course, with a rocky dip into it of about 1 in 3, at full speed, "with a plunge that threw everything into the air that was not lashed or strapped fast, the leader took the dip, ploughed through the sand, throwing up in front like the bow wave of a destroyer, and rocked and plunged herself up the opposite bank."

In East Africa, the armoured cars also had a second enemy, but there it was not sand, but mud. We are told that one car defied the combined efforts of 32 oxen to move it. Many and varied were the jobs of work which had to be undertaken by the squadron, including shifting a river back to its proper course and building roads. The book is in no sense a history of the two campaigns, but the stories of the various incidents are told so interestingly as to make it one of the best war books which have so far appeared. The book is published by Cassell and Co. at 6s.

Badges for U.S. Aircraft.

MESSAGES from Washington, D.C., state that the U.S. Government has adopted a white five-pointed star with a

the right word, have always adopted the non-committal expression "dirigible mixte." Strictly speaking it should be included in the latter class, for in its normal condition the apparatus is "heavier than air" by about 28 kilogs. The gas vessel, which is inflated with hydrogen, has a capacity of 99 cubic metres, being 21 metres long and 3 metres across its greatest diameter. Inside the main gas vessel is a little ballonette having a capacity of 4 cubic metres, which, by being filled with compressed air from an exterior source, enables the pressure of gas in the balloon proper to be kept more or less constant irrespective of expansion and contraction.

Suspended beneath the balloon is the engine, two aeroplanes and a rudder; the driver's seat, which consists merely of a bicycle saddle, being attached to the framework of the motor. Of the two aeroplanes, that in front is, like the rudder, hexagonal in shape, and it is also mounted on a swivel, so that its inclination to the horizontal can be varied at will. The rear aeroplane, which measures 4 metres across and 1.2 metres in breadth, is fixed rigidly to its framework. The propeller has two blades, measuring 2 metres in diameter and 1.7 metres in pitch. The engine is an 8-cylinder Antoinette, developing 50 h.p., the general characteristics of which type of motor are already familiar to our readers.

RUMOURED SALE BY THE WRIGHT BROTHERS.

During their brief stay in Paris, to which we referred last week, it is now stated under reserve by the *Echo de Paris* that negotiations were entered into by the Wright Bros. with a French company to sell their invention for the sum of a million francs (£40,000). One condition of the sale is said to be the successful manœuvring of a Wright aeroplane for several miles at an altitude of about 300 metres, and it is further mentioned that the military and naval authorities have already agreed to purchase twelve machines from the new company.

GLIDING EXPERIMENTS AT TOUQUET.

Profiting by a favourable north-west wind, Messrs. Delagrè, Voisin, Farman and Colliex recently carried out some gliding experiments on the sands at Touquet. Starting from various altitudes, varying from 10 to 15 metres, on aeroplane gliders of the Chanute type, having about 18 sq. metres of surface, the experimenters made several successful attempts, and the trials are to be carried further as circumstances permit.

red centre on a circular background of blue as a distinguishing mark for U.S. aeroplanes, seaplanes, kite balloons and dirigibles.

America's Aid in Aeroplanes and Aviators.

IN a statement urging a rapid increase in the number of American machines for the Western Front, Mr. Baker, the U.S. Secretary of War, says:—

"According to the best information obtainable, there are about 7,000,000 men on the Western Front, and the addition of a few infantry units, while of great moral value, means little in forcing a decision. A few thousand trained airmen, however, with machines for their use, may spell the difference between victory and defeat. America must make sure that the Allies, and not Germany, secure the permanent domination in the air within the year. It is now certain that if we make the effort we can send enough men and machines within the year to be of great value, and perhaps turn the scale, without handicapping our plans for the army which is to follow, nor hindering the vital flow of food and munitions. American airmen and aeroplanes may turn the tide. They furnish us the opportunity for immediate service in the fighting line."

The Air Production Board which has been formed in the States consists of Mr. Howard E. Coffin, a Governor of the Aero Club of America; Brig.-Gen. G. O. Squier, signal officer, U.S.A.; Chief Constructor Taylor of the U.S. Navy; S. D. Waldon, Major in the Officers' Reserve Corps; E. E. Deeds, formerly general manager of the National Cash Register Co.; and R. L. Montgomery, of a well-known Philadelphia financial firm. In a statement issued by the Board it is announced that, as a result of a visit to the R.F.C. camp at Borden, Ontario, six aviation schools for cadets have been opened—at the Universities of California, Texas, Illinois, Ohio, Cornell and the Massachusetts Institute of Technology, the whole being under the direction of Professor Hiram Bingham of Yale. It is estimated that there will be 600 cadets in the schools by July 1st. In the meantime nine training grounds are being prepared each to accommodate two squadrons of 150 students with their necessary instructors and 72 aeroplanes.

IN PARLIAMENT.

Grass on W.O. Aerodromes.

MAJOR WHEELER in the House of Commons on June 13th asked whether it is proposed to mow and make hay of the large acreage of grass land purchased or hired by the War Department for the landing stations round the aerodromes in Great Britain?

Mr. Macpherson: It is not possible to allow the grass to grow for hay at training squadron stations, as machines cannot land in long grass and the whole aerodrome is continually being used. At nearly all home defence stations arrangements have been made to let the grass grow on certain portions of the aerodromes, as much as it can be done. Grazing is also resorted to wherever possible to keep the grass down.

Major Wheeler: In many districts can the War Office not consider the whole question more favourably than before? I can quite understand that grazing cannot be carried out on account of aeroplanes landing and going up, but there is a large acreage of grass lands up and down the country which might be mown.

Mr. Macpherson: I will consider the matter.

A Norfolk Aerodrome.

MR. T. WILSON, on June 14th, asked the Minister of Munitions if he is aware that the firm of Higgs and Hill, of London, who are executing work for the Government at an aerodrome in Norfolk, on Saturday last discharged twenty men over military age, at the same time retaining in their service a number of aliens of military age; and what steps, if any, he proposes to take in the matter?

The Financial Secretary to the War Office (Mr. Foster): I have been asked to reply to this question. I am inquiring into this case, and will let my hon. friend know the result in due course.

Trick-Flying over Crowded Areas.

MR. PEMBERTON BILLING asked the Prime Minister whether, in view of the recent accident, he will request the Director-General of Aeronautics to discourage officers of the Royal Flying School from trick-flying over crowded areas or in the vicinity of their own homes?

Mr. Macpherson: Flying over crowded areas, unless necessitated by a definite duty, has always been discouraged.

Air Raid in London.

MR. ASQUITH: May I ask the right hon. gentleman if he can give the House any further information as regards the extent of the damage done by the raid yesterday, in addition to that which has been published?

Mr. Bonar Law: I have made inquiry, and there is no further information about the raid beyond what was communicated to the Press this morning. I am glad to be able to say that Zeppelin "L 43" was destroyed by our naval forces this morning in the North Sea. Soon after being attacked she burst into flames fore and aft, broke in two and fell into the sea.

Mr. Hogge: Would the right hon. gentleman answer the point as to whether the victims of the aeroplanes, and their dependants, are to receive any sort of compensation from the Government?

Mr. Joynton-Hicks: Will the right hon. gentleman be in a position, either now or early next week, to make a statement in regard to the defences of London against hostile aircraft, and will he be able to make any statement on behalf of the Government in regard to possible reprisals?

Sir F. Banbury: Would it be possible by ringing the bell at St. Paul's, or in some other manner, to let people in the City know that an air raid is expected, as this is really very important; and is the right hon. gentleman aware that large sums of money were in the different offices of the banks yesterday which, if notice had been given, could have been put down into the safes? (Hon. Members: What about life?)

Mr. Bonar Law: In regard to the question of the right hon. baronet, I think that we are more interested in the lives of the people than in the money in the banks, though obviously there is no reason why that should be lost; but I may say that the question of warning has already many times before been considered carefully, and I am told that there is a great deal to be said on the other side. Experience has shown us that the result of warning is simply to drive people into the street, and I am informed that yesterday people in the West End actually took taxis to go down to see the raid when they heard that it was taking place.

As regards the question of my hon. friend as to the means to be taken beyond those already taken for protection against air raids, the matter is occupying the closest attention of the Departments concerned, but I am sure that neither my hon. friend nor the House will expect us to say what we are endeavouring to do.

Sir H. Dalziel: Has the Government any information as to a further raid taking place to-day?

Mr. Bonar Law: I have no information beyond the rumour which has reached my hon. friend.

Air Raids.

MR. JOYNTON-HICKS, speaking on the motion for adjournment, said: I should like to ask a question or two with regard to the air raid of yesterday. Perhaps the Home Secretary may be able to make a statement as to a portion of the matter in which a great many people are interested in regard to this air raid. I am not going into the whole question at the present moment, but, as the House knows, yesterday's raid—the third, I think in a fortnight, was the most considerable of all, the casualties, I believe, being something over 500—my right hon. friend will be able to give us in a moment the exact numbers—and there is a somewhat strong feeling amongst the people of London that they would like at least to be reassured that everything that possibly can be done for their protection is being done. I desire to say at once that I do not want a single machine brought back from the front. I do not want the Army or Navy crippled in the slightest degree in order that we here may be kept in safety. The Army comes first, and we want it as fully supplied as possible with the best machines and the best guns. But something might be done for London, for instance, by a system of warning, such as has been done for some provincial towns. I had occasion yesterday to go to Ipswich, and I found they had received warning from their police of a raid, that within a quarter of an hour the German aeroplanes had passed away from Ipswich and were en route for London; the warning was taken off, and the people of Ipswich were able to go about their business in the usual way. I quite realise that London is infinitely larger than any of our provincial cities. At the same time, there was very great disinclination, we remember, in this House a year or so ago to give any kind of warning in provincial cities. It has now been found possible to give warning in all towns on the South and South-East Coasts in order that people may remain indoors. It is very much safer to keep indoors when a raid is taking place than to go gaping in the streets to see what is happening. People in London do not realise the danger, because there is no warning given. It was stated this afternoon that some people even took motor cars to go into the City to see the raid—a most futile and foolish proceeding. If my right hon. friend can give us any idea of whether it is possible to have some kind of warning, such as is given to provincial towns and cities, it might be a great advantage in keeping the people of London under cover, because there will be more raids. I do not think we can assume for a moment that we are out of the wood, and that now Germany has begun this policy of calculated brutality on the people of this country, as apart from the Army, she is likely to stop for one moment.

I do not know whether the Under-Secretary for War can give any information on the other side of the question, apart from police warning, with which the Home Secretary will deal, as to the arrangements made for the anti-aircraft defence of London, and whether he can assure us that the best guns are now being used, or whether there is any hope that in a month or two's time better anti-aircraft guns can be provided for our defence. If it is undesirable to make any statement on that question, I need hardly say that I will not press it. Further than that he may be able to tell us something of the arrangements for sending up aeroplanes for the defence of London. It was freely said at the time of the Folkestone raid that there was notice of it in Great Britain three-quarters of an hour before bombs were dropped on Folkestone. It is also said that 45 minutes at least before bombs were dropped on London the advent of hostile aeroplanes was known over the coast of Essex. If that is so, there was surely time for our aircraft to ascend and meet the enemy in the air. We do not know now whether any were brought down, as was the case in the last raid at Shoeburyness. He will be able to tell us about that. But, generally speaking, I think the House and the country must realise that when machines come over, as they are able now to do, at a height of 15,000 to 20,000 ft., and at a speed of 80 to 100 miles an hour, it may not be always possible to stop them. I do not ask the hon. gentleman to give an assurance that it is at all possible completely to eliminate raids of that kind, but I do ask the Government—I am not pressing for a reply—at the present time—to take into very serious consideration the policy of reprisals on German towns. Germany has now entered on warfare, not only against the Army of Great Britain, but has declared deliberate war on the nation, the men, women and children of our country. She is going definitely and persistently to pursue that warfare on the nation, and I submit to the House and the Government that the time is very rapidly approaching when, whether we like it or not, we shall be forced to declare war in the same way on the German people. Not that I have any desire whatever for the exercise of cruelty, or to slay Germans because they have slain our people. I say this because I believe it is the only possible way of bringing home to the German nation the enormity of what they have done—that is, the adoption of the policy on their part of destroying the English civilian population in the way they have done. I ask the Government to state, not that there will be a small and insufficient raid on a town like Cologne or any similar German town, but that as soon as a raid of this sort, involving, as it has done, 500 casualties, takes place, stern and swift reprisals will take place on German towns. I ask for that, and that the Government should very seriously consider it. I cannot ask the hon. gentleman to make a statement on that to-night because it must be a matter for the very careful and serious consideration of the War Cabinet, but I do ask him to inform the War Cabinet that feeling is rising and that the only certain way of stopping these raids, in spite of the defence we may make by means of our aeroplanes and anti-aircraft guns, is that we shall punish, and punish severely, raids of this kind by inflicting similar raids with certainty—because they are useless without certainty—on German towns. If the right hon. gentleman can give me some information I shall be very glad.

Sir G. Cave: It is only natural after so serious a raid as that which occurred yesterday that a statement should be asked for regarding it at the earliest moment in the House of Commons, and that Members should want the fullest information that can properly be given to them. I have the figures as last ascertained of the casualties which occurred yesterday, and they are very serious. The number of killed as far as yet known is 104, the number seriously injured 154, and the number slightly injured 269. These figures make a total of 527 casualties, including, I am sorry to say, 120 children, either killed or injured. Our enemy has made the statement that his aeroplanes yesterday bombarded the fortress of London. I hope it will not be forgotten that among the victims of that bombardment are 120 young children, a number of them under five years of age. With regard to the questions that have been asked, he will not expect me to deal with those detailed points he has raised, or with the large question of policy referred to in the last part of his speech. I can only deal to-night with this question relating to the warnings which have been given of air raids. That is a question which, of course, has been considered in conjunction and consultation with the home forces. It is a matter which has never been an easy matter, and has been dealt with very carefully indeed. Of course, the moment hostile forces reach the coast, or approach the coast, warnings are sent to headquarters in London. The air raid warning is of course distributed among the centres to which information ought to be given, namely, to the headquarters of the police, the police stations, explosive factories, and other places which I need not particularise. Apart from that the police both ordinary and special, have instructions to give all possible warning to people in the streets in the case of real danger, to go under cover, and the only question that has been raised, and which has caused any doubt in my hon. friend's mind, is whether some warning should not be given to the public, either by hooters or in some other way that an air raid is impending. That is a question upon which I do not wish to pronounce a final opinion. It has been considered time after time, and I have always found it remarkable that on every occasion the experts have been unanimously of opinion that any public warning to the public as a whole of an impending air raid should not be given. Of course, it will be given if given at all to the whole of this great metropolis of London. You cannot particularise for more than one district any more than you can in places like Ipswich or the small towns where it is given. If you give a public warning you give it to the whole of London. In the second place, it must not be forgotten that cases where there is a raid threatened or impending are many times more than cases where an actual raid occurs. In fact, in London I think in the last two raids no warning could be given, because certain precautions were not observed, whereas for the last five times before yesterday when the warning was given there was no raid. It follows that if you are to give a warning you must give it on all occasions. The result is immediate dislocation in the minds of the people. Many others go down and look up at the air, as we all know from yesterday's and to-day's experience. And to-day there was no raid at all. They leave their work, not for a short time, but in many cases for the whole day. And the day's work is lost. In nearly every case where a warning is given of an air raid the man quite naturally leaves his work and is entitled to go home and make sure that his home and people are safe. Therefore a warning of this kind only results in the loss of a day for many thousands, perhaps hundreds of thousands of workmen. There are two munition factories close to each other in one particular district just outside London. In one case they heard of the last raid and the 4,000 men who were warned left their work and lost a day's work. In the other factory some thousands of men had their whole day's work hindered from the same cause. To-day there was no raid, and what I have said shows how much work may be lost by warnings given when raids do not ensue. If you give that warning to all munition factories and it is not needed you put a stop to the manufacture of munitions which will have its effect upon the fighting forces and the lives of our soldiers and sailors. That is an important consideration from the point of view of the Ministry of Munitions. If we made it a practice to give a public warning on every occasion when a raid is supposed to be possible that would result in such a dislocation of ordinary occupations and our preparations for war, that we should in that way afford the greatest possible satisfaction to our enemies. It would, in fact, be worth the enemy's while to have these raids every day of the week, and the result would be well worth their while if they knew what I have described would be the result of each attempt.

One other point, and it is the most important of all. It is, if warnings were given, would they have the effect of saving life? I am advised that they would not have that effect. Of course, I put the saving of life before every other consideration. Supposing we gave warnings by such means as loud-sounding hooters I am advised that sudden warnings in this way of impending air raids would have the effect of overcrowding in the streets and trams, and people would suddenly crowd into the Tubes and other places, and this of itself might result in a serious loss of life. When warned of an air raid, the impulse of many people would be not to run indoors, but out of doors. Most of us yesterday and to-day, when the news went round, saw people leave their houses and shops and congregate in groups on the pavements watching for the machines in the air.

Mr. MacVeagh: And on the Terrace of the House of Commons.

Sir G. Cave: That is the effect of a public warning, and it is a danger against which we all ought to guard. It is a wise and prudent thing to go under cover, I do not mean to say that that is an absolute protection. It happened yesterday that the persons who were killed and injured under cover were more numerous than those who were killed in the open. I attribute that to a great extent to the fact that the police induced so many to go under cover. I know they did their best. I know of one well-known house where a number of employes rushed out and the policeman exerted himself to drive them indoors, and he succeeded very well. Just afterwards a bomb exploded near to the house, and the lives of those people were saved.

That is an instance where going under cover resulted in the saving of life. I cannot too strongly warn people that the wisest thing that they can do when an air raid occurs is to go under cover. The fact that they are behind a wall or under a solid floor of some kind is in itself almost a certain protection against injury, and, if people would take the precaution of getting under cover, a great number of lives now lost would be saved. I do not at all close my mind upon the matter, but I wish to tell the House that the opinion of all the experts and of all the business men whom we have consulted is that upon the whole we are wisest, both from the point of view of carrying on the war and from the point of view of protecting life and the safety of persons, in not giving a general public warning by hooter or some means of that kind.

Mr. Joynson-Hicks: Could the right hon. gentleman at all events extend the warning to the hospitals? The London Hospital which treated 190 patients yesterday had no warning whatever, and had no time to prepare.

Mr. Flavin: I was going to suggest that point. I think that public institutions, public schools where there are infants, and the hospitals, where there are wounded soldiers, ought to be given warning.

Sir H. Dalziel: The Leader of the House informed us yesterday that one of the enemy raiders had been destroyed. Can the right hon. gentleman confirm that or add any information as to whether any other machines were brought down?

The Under-Secretary of State for War (Mr. Macpherson): Perhaps the House will allow me, in a few words, to reassure my hon. friend the Member for Brentford (Mr. Joynson-Hicks) that everything that is possible has been done and is being done to ensure the best possible defence for this city. I may tell my hon. friend, as I think he knows, that we have a good supply of the best available guns and the best available pilots who yesterday ascended the moment orders were given. As the House knows well, the raiders came across the Channel in about twelve minutes, and, as the Home Secretary has pointed out, on at least four or five occasions we were ready, and we never really know when they may come directly over London. With regard to the point raised by my right hon. friend the member of Kirkcaldy (Sir H. Dalziel), so far as I know there is no further information with regard to the number of raiders brought down than that conveyed to the House last night by the Chancellor of the Exchequer.

Sir H. Dalziel: One was brought down?

Mr. Macpherson: I understand that is true. I got definite information yesterday that one was brought down in the eastern part of Essex near Shoeburyness. As far as I know—and I think I can assert definitely—no further raiders were brought down in the raid of last night. I am not going to enter into one of the points to which my hon. friend directed my attention—the point of reprisals. My hon. friend knows that is purely a question of policy for the Government, but we may assume that the raid which took place yesterday on London was merely a reprisal on the part of the Germans for the very continuous and effective raids which we ourselves have taken the precaution of inflicting upon them, particularly round about the dangerous area of Zeebrugge. I have been in communication with the Home Defence authorities, and they tell me that they are satisfied with the home defence of London as it is at the present time, but they are now, particularly after yesterday, seeing whether in any possible way that defence can be improved. As my hon. friend, who has just paid a visit to the Front, will realise, the amount of work which is being done by our very best pilots and our very best guns at the Front may occasionally handicap the home defence. I can assure him upon this point that not only are we now satisfied that we have got the men, the aircraft guns and the machines at the Front suitable for very effective raiding and for very effective defensive purposes along the Front and also in German territory, but we have at the present time a very good supply of pilots, men and machines for home defence.

Mr. C. Rees: Has the Home Secretary any information with regard to an attempted air raid to-day?

Mr. Flavin: Can the right hon. gentleman give us any reply to the question whether the hospitals, Red Cross hospitals and public schools in which children are kept get proper notice or any notice if a raid is made?

Sir G. Cave: I believe it is the practice to warn hospitals. If, as the hon. member suggests, one was not warned yesterday, it must have been by some omission. With regard to schools, I am rather doubtful whether it would be wise to give them warning, because the result would be that the children would be immediately asked to leave instead of being kept under shelter.

Mr. Flavin: At a school I am acquainted with there are arrangements for the children being taken away so as to save their lives if a bomb fell there.

Mr. A. Samuels: I saw hundreds of young ladies in Government offices yesterday exposing themselves to very great danger. It would be worth while considering whether penalties should be imposed.

Sir G. Cave: I believe orders are given in Government buildings that employes, especially women, shall seek safety. Undoubtedly there was a warning of an air raid yesterday, but fortunately I do not know yet exactly for what reason, the raiders did not do more than approach the coast. They did not really make any serious attack.

Mr. Samuels: I am not quite sure what buildings they were. They were buildings across the road in the Park.

Air Raid Warnings.

Mr. BILLING, on June 15th, asked whether it is proposed to introduce any systematised form throughout the country, or whether it is proposed to allow the local organisations to make their own arrangements?

Sir G. Cave: The arrangements are made under the supreme direction of the military authorities. London being a special district, special arrangements are made, but this particular method of warning is not recommended as likely to save life.

Mr. BILLING: Are we to understand that no method of warning is to be introduced?

Sir G. Cave: There is a method of warning which is very effective, but this particular method is thought likely to result, not in the saving of life, but possibly in the loss of life.

Mr. BILLING: Was the method which the right hon. gentleman suggests is so effective, employed on the occasion of the recent raid in London?

Sir G. Cave: Yes, so far as time permitted.

Captain Barnett: Has my right hon. friend's attention been drawn to the statement of Lord Knutsford of the London Hospital on the subject?

Mr. Speaker: That also was discussed last night.

Sir C. Kinloch-Cooke asked the Under-Secretary of State for War why no warning was given of the approach of hostile aeroplanes on the occasion of the raid last Wednesday?

Mr. Macpherson: I have nothing to add to what was said by my right hon. friend the Home Secretary last night on the motion for the adjournment.

Aeroplanes and Test Flights.

Mr. BILLING asked the Under-Secretary of State for War whether firms who deliver aeroplanes without having carried out the initial test flights are called upon to make any payment to the War Office for such relief; and, if so, what is the amount of such payment, who receives the sum, and who is responsible for taking the additional risk of putting these machines through their initial flight tests?

The Parliamentary Secretary to the Air Board (Major Baird): Departures from the contract conditions governing delivery by manufacturers are met by corresponding abatements on contract prices. Machines which have been delivered prior to the carrying out of their test flights are put through their tests by service pilots at the acceptance aerodrome. Owing to the thoroughness of inspection during manufacture it is not considered that any special risk is involved.

Mr. BILLING: Is the hon. gentleman aware that an exceptionally high price is charged by all private pilots to put these machines through their tests—it is about £10 a machine, which means a payment of about £10 an hour for this big risk—and is he aware that the Government at the present time are saving that £10 by taking it out of the manufacturer and subjecting the pilot to taking these risks without any additional compensation or insurance?

Major Baird: All I can say is that no casualties have resulted.

Mr. BILLING: In the event of casualties resulting, do you propose to take any action?

Mr. Speaker: That is a hypothetical question.

Royal Flying Corps.

Mr. BILLING asked whether officers of the R.F.C. who failed to qualify as pilots, but who wish to continue in the flying service, are allowed to qualify as observers, or whether, under such circumstances, they are asked to resign their commissions and, that being done, are subject to conscription as privates?

Mr. Macpherson: If an officer fails to qualify as a pilot, and wishes to become an observer, he is accepted for training as an observer, if recommended. If not recommended, an officer who belongs to another unit is returned to his unit as an officer. If not recommended as an observer, but recommended and approved as suitable for another branch of the service, he resigns his commission and joins a cadet unit. If not recommended either as an observer, or as an officer in another branch of the service, he resigns his commission and becomes liable to conscription.

Mr. BILLING: Is the hon. gentleman aware that numerous officers at the present time are being relieved of their commissions in the R.F.C. purely and simply through friction arising with their commanding officers in France, although they are capable pilots, and in these circumstances is he prepared to set up a small court of inquiry, or some form of appeal for these officers, who at present have no form of appeal whatever?

Mr. Macpherson: I cannot accept the statement made by my hon. friend in the first part of his question.

Mr. Watt: Is the hon. gentleman aware of the great difficulties that exist in getting out of the rank of observer into that of pilot?

Mr. Macpherson: I understand that is not true. I understand that observers very frequently become pilots.

Mr. BILLING asked if an officer of the R.F.C. is permitted to engage the enemy on his own initiative if, being either flying or ready to take the air, he observes hostile aircraft operating over this country, and, if he is not permitted thus to engage the enemy, what action is he supposed to take?

Mr. Macpherson: This question must clearly be governed by the suitability of the aeroplane at the officer's disposal for the attack of hostile aircraft.

Mr. BILLING: Are we to understand that a pilot has to make up his mind, while in the air, as to whether or not his machine is suitable to engage; and if he thinks it is suitable, is he entitled to engage the enemy; or, if he is standing by the machine with no senior officer near enough to give him orders, is he entitled to engage the enemy?

Mr. Macpherson: A good deal is left to the discretion of the individual officer.

Mr. BILLING: Is it not a fact that officers have been court-martialled for doing that at Dover quite recently?

Mr. Macpherson: No, it is not.

Leave.

Mr. BILLING asked what number of hours daily officers under instruction at aerodromes are expected to fly; whether the hours apply to Sundays as well as week-days; and what time, if any, is allowed to such officers and their instructors for recreative and recuperative purposes?

Mr. Macpherson: The number of hours flying per diem depends on the weather and the stage of training. Training in flying is carried out on Sundays as well as week-days. Leave is granted periodically both to instructors and to pupils.

Mr. BILLING: Are we to understand there is no regular leave allowed either for instructors or pupils, and that in the ordinary way they can be called upon to put in seven days a week training and instruction?

Mr. Macpherson: Leave, of course, depends upon military exigencies, which are the controlling and determining factor.

Administration.

Mr. BILLING asked the Prime Minister whether he is aware of the incompatibility which is once again becoming accentuated in the combined naval, military, and political administration of the Air Services; and whether, in view of the pending resignation of the chairman of the Air Board, he will consider the advisability of eliminating this friction and consequent official delays by vesting the supreme control of the naval and military aeronautical undertakings in the respective services in and reconstructing the Air Board under one Minister of initiative imagination and experience, with powers to organise from the surplus of the naval and military requirements an air fleet to carry the air war into the enemy's country independent of our ordinary naval and military undertakings, thus expanding our aeronautical operations and at the same time eliminating the present factions?

Mr. Bonar Law: The answer is in the negative.

Mr. BILLING: Is any definite action at present under the consideration of the Government for instituting an offensive against the enemy in Germany from the air?

Mr. Bonar Law: If it were, I do not think it would be very likely that I should make it known.

Mr. BILLING: Is the policy of the Government going to be altered in view of the question of their refusal to take reprisals for the raids we have experienced?

Officers under Arrest.

GENERAL CROFT asked the Under-Secretary of State for War whether his attention has been called to the fact that on the occasion of a recent air raid

in Kent certain officers were placed under arrest; whether these officers are still under arrest; and, if so, on what charge were they arrested?

Mr. Macpherson: I have not been able to trace that any court-martial of officers of the R.F.C. were held at Shorncliffe or elsewhere in connection with the Folkestone air raid. The fact appears to be that two officers, not of the R.F.C. were placed under open arrest and subsequently dealt with by their General for an offence against the Defence of the Realm Regulations by removing portions of bombs dropped from hostile aircraft. On an explanation being given, the General was satisfied, and they were released.

General Croft: How long was it before these officers were released, and has the hon. gentleman's attention been called to the fact that no *prima facie* case was made out?

Mr. Macpherson: There must have been a *prima facie* case made out, because these officers were, on their own confession, in possession of these pieces of hostile bombs. My hon. and gallant friend knows that that is an offence under military orders.

General Croft: Is it not likely that these officers never heard of that Order, and is it not a fact that the very moment they understood that this material was required they immediately brought it in of their own free will?

Mr. Speaker: The hon. and gallant member ought to give notice of these new questions.

Mr. Billing: Is it not a fact that, despite the hon. gentleman's answer, a certain officer of the R.F.C. was called up before the Commanding Officer for taking the air because he could not get instructions?

Mr. Macpherson: I have no information whatever about that. I do not think it is the fact.

Mr. Billing: If I give the hon. gentleman information will he act upon it?

Mr. Macpherson: With regard to the question put by my hon. and gallant friend (General Croft), I pointed out in my answer that the moment a reasonable explanation was given the men were released.

General Croft: Is it desirable that officers should be placed under arrest for trivial offences of this kind?

Mr. Macpherson: The charge against them was disobedience to orders. It is a well-known fact, which may not have been brought to the knowledge of these particular officers, that at all these aeroplane stations there is a definite order that no officer should be in possession of any piece of a hostile aeroplane.

Mr. Watt: Are they to be kept in the Service?

Petrol.

Mr. BILLING asked the Financial Secretary to the War Office what price they are now paying per gallon for high-grade petrol for aeroplane work, and what price per gallon they are paying for low-grade spirit?

Mr. Macpherson: I do not think it desirable to publish contract prices.

Enemy Aeroplanes Destroyed.

GENERAL CROFT asked the Prime Minister whether he will state the number of enemy aeroplanes known to be destroyed or driven down since July 1st, 1916, respectively?

Mr. Macpherson: Information on this subject is announced in the *communiqués* from the various fronts which are published in the Press. Compilation of the complete statement, for which my hon. and gallant friend asks, would involve a good deal of work, and I trust that he will not press for it.

Mr. Billing: When two or three machines are shot down and 15 or 16 are seen to disappear and it is stated that 18 enemy machines have been lost, are we to accept that Press statement as an accurate statement that 18 aeroplanes and pilots belonging to the enemy have been killed, or is it purely to delude the public?

Mr. Hogge: Do we understand that the War Office, while it may not be able to give it now, is keeping an accurate account of this item as they are of the other items?

Mr. Macpherson: Yes, we are, of course, keeping an accurate account and we are only too anxious to give it, but at present it involves a certain amount of inaccurate information because we are not quite certain whether, when we see an aeroplane going down, it has actually been destroyed or not, and we think it much better at present not to give any information at all rather than to give inaccurate information.

Mr. Billing: If you are not sure when the aeroplane is going down, how do

you decide at some future date whether it is lost—by seeking information from the other side?

The Raid on London.

Mr. BROOKES, on June 18th, asked the Under-Secretary of State for War if he can make a statement on the effect of the pursuit of the raiders in the recent air attack on London; and whether an adequate number of aeroplanes exist in this country for the purpose of defence?

Mr. Macpherson: One pilot reports that he attacked and drove down an enemy machine while over the sea. The machine was out of control, but the clouds below prevented our pilot from seeing whether the machine fell into the sea or not. There is no corroborative evidence. As to the second part of the question, I am afraid that I can add nothing to the statement made on this subject on the Adjournment on Thursday last.

Aircraft Construction and Excess Profits.

Mr. JOYNSON-HICKS asked the Chancellor of the Exchequer whether he is aware that aeroplane and engine construction is being seriously retarded by the action of the Treasury in not settling with the manufacturers the basis of excess profits of the industry; and whether the proposes to take any action in the matter?

Mr. BONAR LAW: The Commissioners of Inland Revenue inform me that the pioneer aircraft firms, to which I understand the hon. member to refer, are contemplating making application under Section 42 (2) of the Finance (No. 2) Act, 1915, for an alteration of the pre-war standard of profits. These applications when received will be referred to the Board of Referees to deal with.

Mr. Goldstone: Is it the fact that any manufacturers have been restricting output until they have arranged with the Treasury how they will be affected by the Excess Profits Duty?

Mr. BONAR LAW: I certainly believe nothing of the kind has taken place.

Mr. JOYNSON-HICKS: In regard to the establishment of new factories, is that not necessary for making further output?

Air Raid Warnings and Reprisals.

Mr. BILLING, on June 18th, asked leave of the House to move the Adjournment on a matter of urgent public importance, namely, to call attention to the resolution passed at the meeting of London citizens on the previous day demanding that the Government shall commence a policy of air reprisals over enemy country without delay, and institute a reasoned system of warning.

Mr. Speaker: The form in which the hon. member proposes to move the Adjournment of the House, of calling attention to the resolution passed, will not, I think, quite do. The earlier portion is really irrelevant. The hon. member is entitled to refer to it in the course of his speech. I will put it in this way: That the hon. member for East Herts asks leave to move the Adjournment of the House, in order to call attention to a definite matter of urgent public importance, namely, the desirability of the Government commencing a policy of air reprisals over enemy country without delay, and instituting a reasoned system of warning. Has the hon. member the leave of the House?

Less than forty members, but not less than ten, having accordingly risen—
Mr. Billing: I beg to claim a division, so that the people of this country will know who are for and who against.

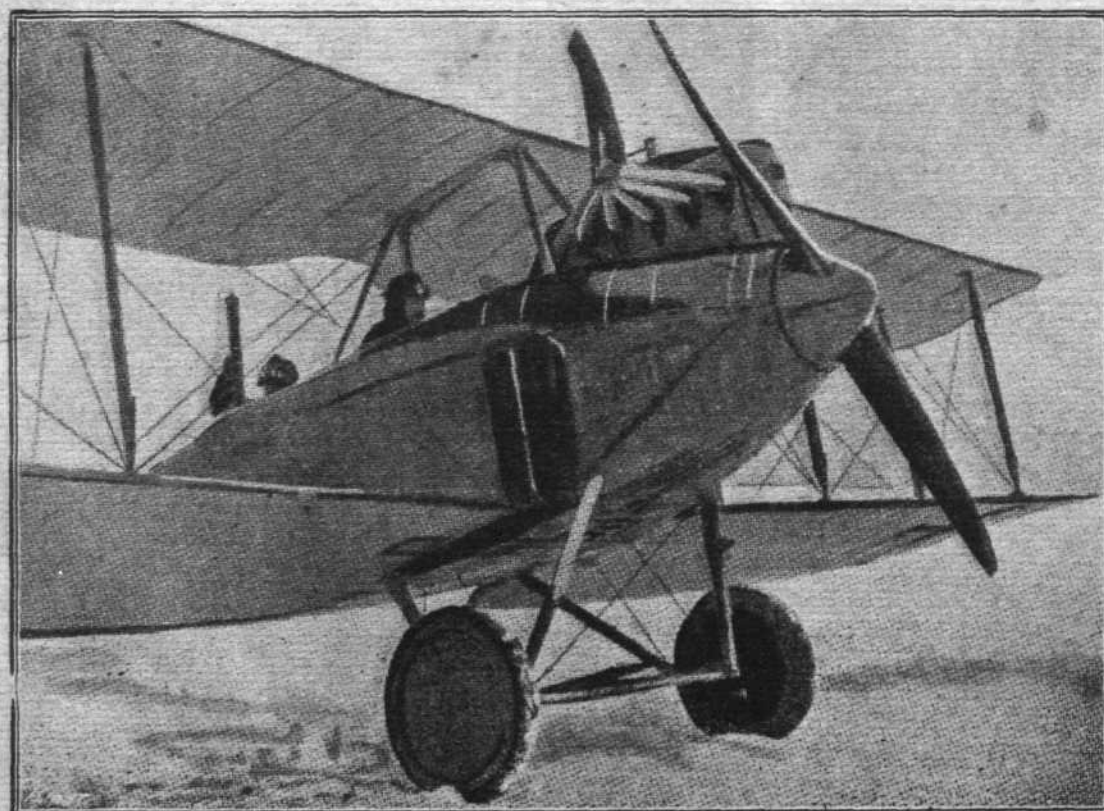
Question put, "That leave be given to move 'That this House do now adjourn.'"

The House divided: Ayes, 25; Noes, 183.

The following were the "Ayes": W. Adamson, Sir J. H. Bethell, R. Blair, Warwick Brookes, J. A. Bryce, H. W. Carr-Gomm, M. J. Flavin, J. S. Fletcher, J. D. Gilbert, J. A. Grant, Col. J. Gretton, R. P. Houston, Major Rowland Hunt, W. Kennedy Jones, J. King, A. A. Lynch, J. O'Grady, Sir W. Pearce, W. M. R. Pringle, W. F. Roch, A. MacCallum Scott, E. A. Strauss, H. A. Watt, Right Hon. T. Wiles, A. W. Yeo.

Tellers for the Ayes: Mr. Billing and Mr. Hogge.

The various discussions in Parliament with regard to air raid warnings and reprisals being in the main more matters concerning the general public rather than of aeronautical importance are not recorded in these pages.



A D.F.W. biplane as built by the Aviatik works. It will be noticed that the wings are no longer swept back, otherwise the machine follows closely along the lines of the pre-war type D.F.W. biplanes. The engine in this instance is a 225 h.p. Benz 6-cyl., with exhaust collectors. Two machine guns are carried, one firing forward "through" the propeller, and the other on a turntable in the rear cockpit. (L'Aérophile.)



Casualties.

Second Lieutenant C. ANDREW BENTHAM, who was reported missing on November 3rd, 1916, and whose death is now officially presumed, was the eldest son of Mr. and Mrs. H. Bentham, of Ritherdon Road, Upper Tooting, S.W. He was educated at Monkton Combe School, near Bath, and immediately on the outbreak of war enlisted in the Fusiliers. Given a commission in the East Surrey Regiment, he afterwards transferred to the R.F.C. It was while flying over the Somme that his machine was seen to be shelled, and came down apparently out of control.

Lieutenant THOMAS RICHARD CHETWYND BIRKIN, Dragoon Guards and R.F.C., killed on June 12th, aged 22, was the eldest son of Mr. and the Hon. Mrs. Stanley Birkin, of Park House, Mapperley, Nottingham. He was gazetted to a Second Lieutenantcy in the Yeomanry in the spring of 1914, being attached to a squadron which was commanded by his uncle, Major H. L. Birkin. On the declaration of war, after training, he proceeded with his regiment to the Gallipoli Peninsula, and was present at the action which took place after the landing at Suvla Bay. Later the regiment was ordered to another front, and in July, 1916, Mr. Birkin obtained a permanent commission in a Dragoon Guards regiment. Returning to England, he was attached to the Reserve Cavalry Depot for a few weeks, and then applied for service in the R.F.C., to which he was temporarily transferred. He passed all his examinations, obtained his wings in nine weeks, and at the beginning of December, 1916, went abroad with a flying squadron. He came home on sick leave at the end of January, but returned to the Front three weeks ago. Mr. Birkin was the eldest grandson of Sir Thomas Birkin, Bt., and a nephew of Viscount Chetwynd. His next brother, Second Lieutenant H. R. S. Birkin, is also serving abroad in the Flying Corps.

Second Lieutenant A. LIONEL CUMMING, R.F.C., killed in action on June 7th, was a grandson of the late Colonel R. O. Cumming, 52nd Regiment, of Coulter, Cheltenham, and fourth son of Mr. J. H. Cumming, whose death, the result of an accident, occurred in Valparaiso on the same day as that of his son at the Front. Three other sons are serving, and the fifth is now on his way home for the same purpose.

Lieutenant GEORGE WESTON DEVENISH, R.F.A. and R.F.C., who was killed on June 6th, was the elder son of Mr. and Mrs. Weston Devenish, and was born at Hillfield, Mitcham, on July 25th, 1893. He entered Charterhouse in September, 1907, and represented his school at Bisley in the shooting eight in 1910 and 1911. From there he passed into Woolwich in January, 1912, and passed out into the Royal Field Artillery in July, 1913. He went to the Front in August, 1914, and was wounded in October of the same year. He returned to active service on June 1st, 1915, and had been serving continuously ever since. In May, 1916, he was temporarily attached to the R.F.C., and took his pilot's certificate in October of that year.

Second Lieutenant HERBERT MARSHALL (ROY) HEADLEY, R.F.A., attached R.F.C., officially reported killed on March 11th, was the only son of Mr. and Mrs. E. M. Headley, of Uplands, Redhill, and the only grandchild of Mr. and Mrs. F. W. Herbert, of Brookfields Moss, Herefordshire. At the beginning of the war, when only 17 years of age, he enlisted in a Lancers regiment, but in May, 1915, he obtained a commission in the Field Artillery, and went to the Front in January, 1916. On May 24th following he volunteered for trench mortar work and remained in a trench mortar battery until last December, when he obtained a transfer to the R.F.C. In the engagement in which he took part on March 11th, at a height of 8,000 ft., his machine was hit, and he was apparently wounded, but continued to fire his gun as the machine descended into the enemy's lines. His grave has since been found on reconquered territory.

Captain HORACE CLIFFORD LOMER, R.N.D., attached R.F.C., killed in action on May 5th, was the only son of Horace Arthur Lomer, of Invermark, Elmbourne Road,

S.W., and was 27 years of age. He was educated at Dulwich College, and joined the R.N.D. in November, 1914, receiving his commission in January, 1915, and his captaincy a year later. He transferred to the R.F.C. last August, obtained his wings in December, and left for the Front on January 10th.

Sub-Lieutenant JOHN EARLE MAXWELL, R.N.A.S., who is now reported to have been killed on March 30th, 1917, after having been previously reported missing, was the elder son of Mr. and Mrs. J. A. Maxwell, of 84, Dartmouth Road, Brondesbury, N.W. He was educated at Haileybury and was a student at Guy's Hospital at the outbreak of war. He obtained a commission in the R.N.V.R., and was attached to the R.N.A.S. as an Observer, and his machine was shot down in Bulgaria. He was a Fellow of the Royal Astronomical Society, and a member of the British Astronomical Society and other scientific societies.

Lieutenant WILLIAM WRIGHT SAWDEN, R.G.A. and R.F.C., reported died of wounds received in action on June 5th, was the only son of Mr. and Mrs. W. J. Sawden, of Cottingham, East Yorks. He was 26 years of age, and was educated at Hymers College, Hull. Later he was engaged in the corn trade, but joined the 1st Sportsmen's Battalion of the Royal Fusiliers in September, 1914. In October, 1915, he received a commission in the R.G.A., and as an expert signaller passed his examination with honours. In July, 1916, he joined the R.F.C., and got his wings in October. He was ordered to the Front immediately, and had been flying abroad continuously.

Captain BEAUFOI JOHN WARWICK MONTRESSOR MOORE, M.C., R.F.C., who was killed in a flying accident on June 10th, joined the R.F.C. in 1914. He was an electrical engineer, having served his time in the works of Messrs. J. C. Fuller and Son, electrical and telegraph engineers, of Woodland Works, Chadwell Heath. He was a member of the Institute of Electrical Engineers. About the time of the outbreak of war he returned from Canada, where he had been engaged on important electrical undertakings, and at once offered himself for service. He was refused a commission on medical grounds, but joined the R.F.C. as a first-class air mechanic. Within a few months he received his commission and pilot's certificate, and shortly afterwards went to the Front. There he remained for about 12 months, during which time he was recommended for the Military Cross, which he eventually received at the hands of the King at Buckingham Palace on February 14th last. Early this year he was recalled, having been selected to give instruction in the manoeuvring of the latest types of aircraft, and it was while carrying out these duties that he was killed.

Missing.

Lieutenant T. MALCOLM DICKINSON, Indian Cavalry, attached R.F.C., who is reported missing, was the son of the late Captain Dickinson, R.A., and Mrs. Paget Davies, of Brunswick Terrace, Hove. He was last seen fighting a German aeroplane over hostile territory.

Married and to be Married.

At St. George's, Hanover Square, the marriage took place on June 14th of Captain MATTHEW TALBOT BAINES, R.F.C., elder son of Mr. and Mrs. Matthew Baines, of Buckhill House, Calne, Wilts, and grandson of the late Mr. L. T. Baines, of Bawtry Hall, Yorkshire, with FLORA, younger daughter of Cavaliere Roberto ALLATINI, 18, Holland Park, W. The bridegroom is now home on light duty, having been wounded whilst flying in France. His machine was badly damaged over the Hun lines, but Captain Baines managed to get back a few yards behind our front trenches.

A marriage has been arranged between Lieutenant-Colonel U. J. D. BOURKE, Oxfordshire and Buckinghamshire Light Infantry and R.F.C., only son of Surgeon-General Sir George and Lady Bourke, and IRENE, youngest daughter of Mr. and Mrs. Lewis ASHHURST, of Norwich.

On June 12th, at Chapel Royal, Savoy, Flight Sub-Lieutenant NEVILLE G. HODSON, son of the late Mr. John

Hodson and Mrs. Hodson, of 6, Glendale Road, Hove, was married to PHYLLIS MARGARET, youngest daughter of Mr. Arthur H. MARRINER, of Keighley, Yorkshire, and Mrs. Marriner, of 24, Portland Court, W.1

The engagement is announced between Second Lieutenant ROBERT LANGLEY, R.F.C., eldest son of the Rev. John Langley, Rector of North Wraxall, and Mrs. Langley, and LORNA, third daughter of Sir Oliver and Lady LODGE.

An engagement is announced between Major E. M. MURRAY, M.C., Q.V.O. Corps of Guides, attached R.F.C., eldest son of Colonel R. D. Murray, I.M.S. (retired), Nevern Square, S.W., and GWLADYS VIVIENNE, only daughter of Mr. Henry H. WOODRUFF and Mrs. WOODRUFF, of Barnsley and Harrogate.

An engagement is announced between Lieutenant REGINALD MARK PLUMMER, Bedfordshire Regiment and R.F.C., elder son of Mr. and Mrs. F. W. Plummer, of Rookwood, Luton, Bedfordshire, and MURIEL CORISANDE RADCLYFFE, eldest daughter of Major C. R. E. Radclyffe, J.P., R. of O., Life Guards, and Mrs. Radclyffe, of Hyde, Wareham, Dorset, and Foxdenton Hall, Lancashire. The marriage will take place at St. Peter's Church, Eaton Square, on the 23rd inst., at 12 o'clock.

Items.

Lieutenant H. B. BELL-IRVING, who was in command

of the drifter which, as recently announced by the Admiralty, engaged five enemy seaplanes and destroyed two, belongs to a famous family of fighters from Vancouver. Another member, Captain Malcolm Bell-Irving, holds the D.S.O. and the Military Cross; his brother was killed while flying at Norwich. A third member—Lieutenant A. D. Bell-Irving—brought to earth two German aeroplanes and an observation balloon. Three Military Crosses, in addition to other decorations and several "mentions," are to the credit of this family so far.

A memorial service was held on June 13th at St. Margaret's, Westminster, conducted by Canon Carnegie, and at which the Archbishop of Canterbury assisted, for Lieutenant HENRY TENNANT, Scots Greys and R.F.C., son of Mr. H. J. Tennant, M.P., formerly Under-Secretary of State for War, and subsequently Secretary for Scotland in Mr. Asquith's Government, who died from wounds received in action on May 27th. The R.F.C. and the Scots Greys were represented by detachments of officers and men, and at the conclusion of the service trumpeters of the Scots Greys sounded the Last Post.

The will of the late Captain CECIL ROBERT TIDSWELL, 1st Royal Dragoons and R.F.C., of Bosmere Hall, Needham Market, Suffolk, who was killed in action on October 16th last, has been proved at £14,185.



"X" AIRCRAFT RAIDS.

In view of the decision of the Government not to allow details of places visited by enemy aircraft to be published, we are, as before, giving to each one an index number. Eventually, when details are available, we shall give the respective information under these index numbers, which will facilitate easy reference to each particular raid.

"X 63" Raid (June 13th).

THE following *communiqués* were issued by the Field-Marshal Commanding-in-Chief, Home Forces, on February 13th:—

"In continuation of this morning's *communiqué*, the first bombs were dropped on the eastern outskirts of London at about 11.30 a.m.

"Numerous bombs now fell in rapid succession in various districts in the East End. One bomb fell in a railway station, hitting an incoming train. Seven persons were killed and 17 injured here. Another bomb fell on a school, killing 10 and injuring about 50 children. A number of warehouses were damaged and fires caused.

"Up to the present the casualties reported in the London area are 41 killed and 121 injured. The lists are at present incomplete, and the final figures may be greater.

"A few bombs were also dropped near the North Foreland, and on the opposite banks of the Thames, four persons being injured.

"The air raid over London lasted about 15 minutes.

"The raiders were engaged by the guns of the East London defences, and a large number of aeroplanes of the R.F.C. and R.N.A.S. were sent up as soon as the enemy was reported off the coast.

"Several engagements took place in the air, but the results are at present uncertain."

11.30 p.m.

"Latest police reports show that the casualties so far reported in to-day's air raid are:—

Killed:—Men, 55; women, 16; children, 26. Total, 97.

Injured:—Men, 223; women, 122; children, 94. Total, 439.

"No damage of a military or naval nature was done."

German Version.

Berlin, June 14th.

"A fleet of our large aeroplanes yesterday afternoon reached London and dropped bombs over the fort, and during clear weather observed the effects of good hits.



An Air Raid in Germany.

THE *Rheinische Westfälische Zeitung* states that on the night of June 4th-5th a large number of enemy airmen in several squadrons bombed a number of places between the Moselle and the Saar. Most of the bombs did not cause any damage, but at the village of Dantingen three houses were

"In spite of a strong defensive fire and numerous aerial engagements, during which an English airman fell down over the Thames, all the aeroplanes returned unharmed."

"X 64" Raid (June 17th).

FOLLOWING are the reports issued on June 17th by the Field-Marshal Commanding-in-Chief, Home Forces:—

4.10 a.m.

"Early this morning some enemy airships approached the East and South-East Coasts. At about 2 a.m. two airships came a short distance inland, one crossing the East Anglian coast, the other coming over Kent for a few minutes. Bombs are reported to have been dropped by the latter ship. Some damage was done and a fire broke out in a coast town. No further details are yet to hand."

Later,

"One Zeppelin brought down in flames."

4 p.m.

"In continuation of the *communiqué* issued at 4.10 a.m. to-day: Last night's raid was carried out by two enemy airships. One airship crossed the Kentish coast at about 2 a.m. and dropped six bombs on a coast town. The latest police reports state that two persons were killed and sixteen injured. A large number of houses were damaged.

"The second raider made an attack on a coast town of East Anglia at about 2.30 a.m. She was heavily shelled by the guns of the anti-aircraft defences and was driven off. It is probable that she was damaged by gunfire. Shortly afterwards this raider, after dropping a number of bombs in open places, was engaged and brought down in flames by a pilot of the Royal Flying Corps. The airship was destroyed. No casualties or damage were caused in East Anglia."

German Version.

Berlin, June 18th.

"On the night of the 16th-17th one of our naval air squadrons, under the command of Capt. Victor Schuetze, attacked important fortresses in the South of England, good results being observed. The airships had fierce fighting with the British sea and land forces and airmen, in the course of which 'Z 48' was brought down in a burning condition over the sea by an enemy airman. The whole crew and the commander above mentioned met the deaths of heroes. The remaining airships returned safely."

damaged and one person was slightly wounded. At Haiss, half-way between Metz and Merzig, a house was struck, and the burgomaster and his wife were killed. The attack was not directed against the German industrial districts of the Saar Basin. On that night no enemy airmen dropped bombs there. All the places visited by the enemy are on the plateau of Lorraine.



The British Air Service

"PER ARDUA AD ASTRA"



UNDER this heading are published each week the official announcements of appointments and promotions affecting the Royal Naval Air Service and the Royal Flying Corps (Military Wing) and Central Flying School. These notices are not duplicated. By way of instance, when an appointment to the Royal Naval Air Service is announced by the Admiralty it is published forthwith, but subsequently, when it appears in the LONDON GAZETTE, it is not repeated in this column.

Royal Naval Air Service.

G. W. Barber entered as Warrant Officer (Temp.) 2nd grade, seniority June 17th.

Late Temp. Lieut. (R.N.V.R.) C. S. Donnelly granted a temp. commission as Lieut.-Comdr, R.N.V.R., seniority June 12th.

H. W. Crowther granted a temp. commission as Sub-Lieut., R.N.V.R., seniority June 12th.

Chaplain and Naval Instructor.—The Rev. T. W. Robinson, B.A., to R.N. Hospital, Great Yarmouth, and for R.N. Air Station; June 17th.

Lieutenant (Temporary R.N.V.R.).—C. Harrison, to "President," for Crystal Palace; June 10th.

W. L. Keates and S. H. Gudgan, both entered as Prob. Flight Officers (Temp.), seniority respectively April 17th and 30th.

Sub-Lieutenant (R.N.V.R., Temporary).—J. McA. Stuart, entered as Prob. Flight Officer (Temp.), seniority June 20th.

H. F. S. Kilby, entered as Prob. Flight Officer (Temp.), seniority May 24th.

R. Fryett, granted temp. commission as Asst. Payr. (R.N.R.), seniority June 15th.

The following Prob. Flight Officers (Temp.) have been promoted to Flight Sub-Lieuts. (Temp.), seniority as follows: C. Stoneman; Feb. 23rd. P. G. Stokes-Rees, F. W. Dolman and E. G. Wilkinson; Mar. 9th. F. J. W. Mellersh, A. H. Webber and J. L. Langton; Mar. 26th. D. A. Duncan; Mar. 27th. G. N. Trace; April 9th. C. Becker; April 25th. J. G. Hay, P. G. Shepherd, and N. I. Larter; May 9th. N. P. Playford; July 17th.

Sub-Lieut. (Temp., R.N.V.R.) J. R. Wilson entered as Prob. Flight Officer (Temp.), seniority June 17th, and appointed to "President," additional, for R.N.A.S.

E. G. Wilkinson entered as Prob. Flight Officer (Temp.) seniority June 7th, and appointed to "President," additional, for R.N.A.S.

Assistant Paymasters (Temp., R.N.R.).—A. E. C. Marshall, to "President," additional, for account duties at R.N. Air Station, Eastchurch; to date on relief.

Royal Flying Corps (Military Wing).

Squadron Commander.—Capt. H. J. F. Hunter, M.C., Rif. Brig., from a Flight-Comdr., and to be Temp. Major whilst so employed; June 1st.

Flight-Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed:—Temp. 2nd Lieut. G. H. Cock Gen. List; May 20th. Temp. 2nd Lieut. G. Knight, Gen. List; 2nd Lieut. F. W. Ward, N. Staff. R.; May 23rd. Temp. Lieut. T. F. Hazell, Gen. List; Lieut. A. B. Fanstone, S.R.; Lieut. T. Perkins, S.R. (since killed in action); May 25th. 2nd Lieut. E. B. Cahusac, S. Staff. R., S.R.; May 26th. Temp. 2nd Lieut. P. W. Chambers, Gen. List; May 27th.

Flying Officers (Observers).—Lieut. (Temp. Capt.) S. Le G. Cutler, A.S.C., seniority Jan. 9th, and to be secd.; Temp. Lieut. J. V. Hay, Gen. List, seniority Feb. 8th; Temp. 2nd Lieut. T. Brownrigg, Middx. R., seniority Feb. 15th, and to be transf. to Gen. List; Temp. 2nd Lieut. C. Bousfield, W. York. R., seniority Feb. 25th, and to be transf. to Gen. List; Lieut. F. R. Cubbon, Ind. Inf., seniority from April 8th; May 23rd.

Balloon Officers.—Temp. 2nd Lieut. A. Hodgkins, Gen. List, from an Equipment Officer, 3rd Cl.; Mar. 13th. Temp. 2nd Lieut. (on prob.) J. E. Blackbeby, Gen. List; Temp. 2nd Lieut. (on prob.) A. E. C. Y. Bramble, Gen. List; Temp. 2nd Lieut. (on prob.) F. W. J. Collier, Gen. List; May 1st. Lieut. W. J. E. Griffiths, Can. Art.; Temp. 2nd Lieut. (on prob.) J. L. King, Gen. List; Temp. 2nd Lieut. (on prob.) R. Massey, Gen. List; May 17th.

Equipment Officers, 3rd Class.—2nd Lieut. (on prob.) H. P. Beasley, S.R., April 2nd. Temp. 2nd Lieut. (on prob.) D. F. Upjohn, Gen. List; May 5th. Temp. 2nd Lieut. (on prob.) E. M. S. Levin, Gen. List; May 25th.

Memorandum.—Temp. 2nd Lieut. R. de Sarigny to be Temp. Lieut. whilst serving with R.F.C.; May 1st.

To be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.:—2nd Cl. Air-Mech. W. Gawkrödger, from R.F.C.; May 6th. E. Piggett; May 27th. L. H. Straker, from R.N.V.R.; Pte. W. G. Andrews, from R. Fus.; June 1st.

Supplementary to Regular Corps.—2nd Lieuts. to be Lieuts.:—H. Slingsby, H. D. Crompton, May 1st; F. C. Deane, May 6th; C. R. Young, May 12th.

London Gazette Supplement, June 13th.
Flying Officers.—Temp. 2nd Lieut. J. G. Barron, Gen. List; Mar. 6th. 2nd Lieut. S. P. A. Bousfield, Sea. Highrs., S.R., from a Garrn. Bn., R. Scots, and to remain secd.; 2nd Lieut. J. F. Turner, Ches. R. (T.F.), from a Flying Officer (Ob.), seniority Aug. 31st; April 3rd. 2nd Lieut. (Temp. Lieut.) O. V. St. J. Williams, Yeo. (T.F.), and to be secd.; April 5th. Temp. Capt. J. L. Williams, Garrn. Bn., L'pool. R., and to be transf. to Gen. List; April 13th. Temp. 2nd Lieut. H. L. Marvin, Gen. List; April 16th. 2nd Lieut. B. H. Bean, R.W. Fus. (T.F.), and to be secd.; April 18th. Temp. 2nd Lieut. E. B. Greenhouse, R. Sc. Fus., from attd. R. Scots; Temp. 2nd Lieut. A. M. T. Glover, K.O. Sco. Bord.; April 21st. Capt. T. A. Francis, R. Ir. R., and to be secd.; April 24th. 2nd Lieut. R. H. Deakin, Ind. Army; April 26th. 2nd Lieut. R. S. Burch, T.F. Res.; Temp. 2nd Lieut. H. W. Carter, Gen. List; Temp. 2nd Lieut. (on prob.) N. Fitzgerald-Eager, Gen. List; 2nd Lieut. (on prob.) C. F. le Poer Trench, S.R.; May 20th. 2nd Lieut. S. H. Griffiths, Ches. R., from a Flying Officer (Ob.), seniority Aug. 10th; Lieut. D. M. Christie, Can. Inf.; May 21st. 2nd Lieut. C. W. Pengelly, N. Lan. R. (T.F.), and to be secd.; 2nd Lieut. R. F. Bush, S.R.; Temp. 2nd Lieut. (on prob.) E. H. Cross, Gen. List; Temp. 2nd Lieut. D. C. H. MacBrayne, Gen. List; Temp. 2nd Lieut. (on prob.) P. C. Ross, Gen. List; Lieut. W. M. Davidson, Can. Gen. List; 2nd Lieut. (Temp. Lieut.) W. D. Cullen, E. Surr. R. (T.F.), from a Flying Officer (Ob.), seniority July 10th; Temp. 2nd Lieut. L. Booth, attd. R.W. Surr. R., and to be transf. to Gen. List; Temp. 2nd Lieut. J. Chapman, High. L.I., and to be transf. to Gen. List; Temp. 2nd Lieut. (on prob.) A. B.

Jones, Gen. List; Temp. 2nd Lieut. (on prob.) R. H. G. Fenner, Gen. List; May 22nd. Temp. 2nd Lieut. R. H. Dunlop, York. and Lanc. R., and to be transf. to Gen. List; 2nd Lieut. W. R. Gundry, Durh. L.I. (T.F.), and to be secd.; 2nd Lieut. H. W. Price, S.R.; Temp. 2nd Lieut. M. M. McLeod, High. L.I., and to be transf. to Gen. List; May 23rd. 2nd Lieut. H. H. Shorter, Durh. L.I. (T.F.), and to be secd.; Temp. Lieut. S. E. O'Hanlon, M.C., Gen. List, from a Flying Officer (Ob.), seniority May 30th, 1916. 2nd Lieut. J. E. Johnston, Cyclist Bn. (T.F.), and to be secd.; 2nd Lieut. (on prob.) H. B. Billings, S.R.; Temp. 2nd Lieut. (on prob.) F. J. O'Shea, Gen. List; Temp. 2nd Lieut. (on prob.) P. S. Burge, Gen. List; Temp. 2nd Lieut. (on prob.) J. M. S. G. Stevens, Gen. List; May 24th. Temp. 2nd Lieut. (on prob.) H. J. Watlington, Gen. List; May 25th.

Flying Officers (Observers).—Temp. Lieut. L. B. Helder, R. Fus., and to be transf. to Gen. List; Sept. 9th, seniority June 30th, 1916. Temp. 2nd Lieut. G. P. Bulmer, M.C., Shrops. L.I., and to be transf. to Gen. List; May 27th, seniority Feb. 17th. Lieut. G. R. Spencer, Lanc. Fus., S.R., and to be secd.; May 28th, seniority Mar. 5th.

Park Commander.—Temp. Major A. E. G. MacCallum, Gen. List, from an Insp. of Technical Training (graded as a Sqdn. Comdr.); April 10th.

Special Appointment (graded as a Park Commander).—Temp. Lieut. (Temp. Capt.) G. R. Moser, Arg. and Suthd. Highrs., from a R.F.C. Staff Officer, 3rd Cl., and to be Temp. Major whilst so employed, vice Lieut. (Temp. Major) B. S. Foster, Hamps. R. (T.F.); May 17th.

Equipment Officers, 2nd Class.—Lieut. E. F. L. Taylor, Devon. R., S.R., and to remain secd.; Dec. 14th. Temp. Capt. C. H. Murland, R. Ir. Rif., and to be transf. to Gen. List; Mar. 16th. 3rd Cl.: Temp. 2nd Lieut. D. A. Tullis, Gen. List; May 1st.

Memoranda.—2nd Lieuts. (T.F.), to be Temp. Lieuts. whilst serving with R.F.C.: H. O. S. Pilkington, Worc. R.; A. L. Clow, Yeo.; E. W. Kirby, Hamps. R.; J. A. D. Wallis, Lond. R.; Jan. 1st.

D. A. Tullis to be Temp. 2nd Lieut. for duty with R.F.C.; April 2nd.

Supplementary to Regular Corps.—The following 2nd Lieuts. (on prob.) are confirmed in their rank: P. J. Gardiner, W. W. Vick, F. G. Toy, S. J. Young, C. R. Richards, R. F. Bush, H. B. Billings, H. W. Price and P. F. Antelme.

London Gazette Supplement, June 14th.
Wing Commander.—Maj. I. A. E. Edwards, R.A., from a Sqdr. Comdr., and to be Temp. Lieut.-Col. whilst so employed; June 2nd.

Flight Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed:—2nd Lieut. (Temp. Lieut.) D. C. Cunneil, Hamps. R. (T.F.); May 14th. 2nd Lieut. C. E. Robertson, S.R.; Temp. 2nd Lieut. R. C. Savery, Gen. List; May 28th. 2nd Lieut. (Temp. Lieut.) T. Q. Back, R.F.A. (T.F.), and to be secd.; May 30th. Lieut. E. B. Macmanus, S.R.; May 31st.

Flying Officers.—2nd Lieut. R. E. Angus, Yeo. (T.F.), from Temp. Lieut. Mach. Gun Corps; 2nd Lieut. H. G. Cox, R. Suss. R. (T.F.), and to be secd.; May 24th. Temp. 2nd Lieut. E. W. Everiss, A. Cyclist Corps, and to be transf. to Gen. List; 2nd Lieut. L. F. Collin, Essex R. (T.F.), and to be secd.; Mar. 28th. Temp. 2nd Lieut. W. F. Sleeman, Gen. List; April 3rd. Temp. 2nd Lieut. J. H. Moore, Gen. List; May 12th. Temp. 2nd Lieut. (on prob.) G. S. Chester, Gen. List; May 19th. 2nd Lieut. H. W. B. Ricka s, R.A., from a Flying Officer (Ob.) with seniority from Nov. 12th, 1916. Temp. 2nd Lieut. (on prob.) J. H. Colbert, Gen. List; 2nd Lieut. (on prob.) M. J. Clark, S.R.; Temp. 2nd Lieut. (on prob.) R. K. Fletcher, Gen. List; May 22nd. 2nd Lieut. A. W. Simon, R. Suss. R., and to be secd.; Lieut. F. W. Wal er, High L.I., S.R., and to be secd.; 2nd Lieut. W. H. Demel, Manch. R. (T.F.), and to be secd.; 2nd Lieut. A. Richards, Midd's R. (T.F.), and to be secd.; 2nd Lieut. F. G. Toy, S.R.; Temp. 2nd Lieut. (on prob.) D. H. Ogden, Gen. List; Temp. 2nd Lieut. (on prob.) D. D. Phillips, Gen. List; 2nd Lieut. (Temp. Lieut.) B. Strange, Yeo. (T.F.), and to be secd.; Lieut. J. I. Bundy, Canadian Mach. Gun Corps; Temp. 2nd Lieut. (on prob.) D. W. Stacey, Gen. List; 2nd Lieut. P. J. Gardiner, S.R.; May 23rd. Temp. 2nd Lieut. F. J. N. Macrae, R. Highrs., and to be transf. to Gen. List; Temp. 2nd Lieut. H. Brown, Gen. List; Temp. Capt. C. E. Holman, Glouc. R., and to be transf. to Gen. List; Lieut. (Temp. Capt.) C. W. Baldwin, Durh. L.I. (T.F.), and to be secd.; Temp. 2nd Lieut. R. G. H. Davis, attd. R.W. Kent R., and to be transf. to Gen. List; May 24th. Lieut. G. W. T. Pereira, Som. L.I., and to be secd.; 2nd Lieut. (Temp. Lieut.) W. R. Haggas, N. Lan. R. (T.F.), from a Flying Officer (Ob.), with seniority from May 16th, 1916; Temp. 2nd Lieut. (on prob.) F. E. Richardson, Gen. List; Temp. 2nd Lieut. (on prob.) A. B. Shilstone, Gen. List; Temp. 2nd Lieut. (on prob.) L. W. Ramage, Gen. List; 2nd Lieut. (on prob.) H. T. Hammond, S.R.; May 25th.

Flying Officers (Observers).—Lieut. J. J. Boyd-Harvey, Yeo. (T.F.), and to be secd.; 2nd Lieut. (Temp. Lieut.) H. C. Leaver, E. Lan. R. (T.F.), and to be secd.; 2nd Lieut. A. C. Dent, Yeo. (T.F.), and to be secd., April 15th, with seniority from Dec. 6th, 1916; 2nd Lieut. F. A. Hobro, Hereford R. (T.F.), and to be secd., April 15th, with seniority from Dec. 19th, 1916; 2nd Lieut. J. H. Muller, Middx. R. (T.F.), and to be secd., April 22nd, with seniority from Feb. 22nd; Capt. K. W. M. Pickthorn, London. R. (T.F.), and to be secd., May 1st, with seniority from Mar. 9th.

Memoranda.—2nd Lieuts. (T.F.) to be Temp. Lieuts. whilst serving with R.F.C.:—G. A. Scutt, Middx. R.; P. C. Routley, Welsh R.; G. E. G. Round, R.E.; H. I. Newton, Notts and Derby R.; J. Mundie, Gord. Highrs., N. C. Denison, Yorks L.I.; Feb. 1st.

Sergt. D. A. Stewart, from R.F.C., to be Temp. 2nd Lieut. for duty with the Mil. Wing of that Corps; May 29th.

To be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C.:—A. Blair, late 2nd Lieut., R. Scots (T.F.); May 26th. F. A. Carter; June 1st.

General List (R.F.C.).—Temp. 2nd Lieut. G. McPherson is confirmed in his rank; Temp. 2nd Lieut. S. V. D. D. Jones resigns his commission; June 15th.

London Gazette, June 15th.
Staff Officer, 3rd Class (graded for pay as a Staff Captain).—Temp. Capt. V. Ward-Brown, M.C., Gen. List, vice Temp. Lieut. (Temp. Capt.) G. R. Moser, Arg. and Suthd. Highrs.; May 17th.

Squadron Commander.—Capt. (Temp. Major) J. Valentine, S.R., from a Flight-Comdr., and to retain his temp. rank whilst specially employed; May 25th.

Flight-Commanders.—From Flying Officers, and to be Temp. Capt. whilst so employed: Temp. Lieut. H. E. Fletcher, Gen. List; May 22nd. Lieut. T. McD. Hawker, R. Ir. Fus., S.R.; May 26th. 2nd Lieut. (Temp. Lieut.) C. F. Denning, M.C., R.W. Surr. R., May 28th.

Flying Officers.—Temp. Lieut. A. G. Lamplough, N. Staff. R., and to be transf. to Gen. List; 2nd Lieut. A. W. M. Horne, R. Lanc. R. S.R., and to be secd.; May 1st. Temp. 2nd Lieut. (on prob.) H. J. Ball, Gen. List; May 5th. Temp. 2nd Lieut. H. E. Ransom, Durh. L.I., and to be transf. to

Gen. List; 2nd Lieut. R. L. Lyster-Smythe, S.R.; May 7th. Temp. 2nd Lieut. (on prob.) W. R. Jones, Gen. List; Temp. 2nd Lieut. (on prob.) G. T. Harker, Gen. List; May 21st. 2nd Lieut. A. J. E. Behm, Lond. R. (T.F.) and to be secd.; Temp. 2nd Lieut. (on prob.) N. C. Phear, Gen. List; 2nd Lieut. W. L. Douglas, Lond. R. (T.F.), and to be secd.; May 22nd. 2nd Lieut. S. G. E. I. Knox, R.F.A., S.R.; Temp. 2nd Lieut. (on prob.) O. C. Pearson, Gen. List; 2nd Lieut. W. W. Vick, S.R.; Temp. 2nd Lieut. (on prob.) C. M. Sayer, Gen. List; Lieut. W. E. James, M.C., Canadian Gen. List; 2nd Lieut. R. W. Spratling, Manch. R. (T.F.), and to be secd.; 2nd Lieut. R. S. Macfarlane, Gord. Highrs. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) A. R. Baker, Gen. List; May 23rd. Temp. 2nd Lieut. (on prob.) R. C. Lovell, Gen. List; Capt. T. S. Wynn, M.C., Suff. R., and to be secd.; May 24th. 2nd Lieut. D. Darby, Sco. Rif., S.R., and to be secd.; Temp. 2nd Lieut. (Actg. Lieut.) B. S. Marshall, M.C., Train. Res. Bn., and to be transf'd. to Gen. List; 2nd Lieut. H. Ross, S.R.; 2nd Lieut. (Temp. Lieut.) L. D. Baker, R. Dub. Fus., S.R., from a Flying Officer (Ob.), seniority July 10th. Lieut. J. A. Convery, Can. Gen. List; Lieut. W. A. M. Cox, R. Highrs. (T.F.), and to be a secd.; Temp. 2nd Lieut. O. L. Burt, Northd. Fus., and to be transf'd. to Gen. List; 2nd Lieut. R. G. Holt, E. Lan. R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) V. G. B. Parton, Gen. List; May 25th. Lieut. H. S. Taylor, Can. Mtd. Rif.; 2nd Lieut. (Temp. Lieut.) R. Stephenson, Ches. R., from a Flying Officer (Ob.), seniority May 9th, 1916, and to be secd.; Temp. 2nd Lieut. T. K. Twist, Gen. List, from a Flying Officer (Ob.), seniority June 11th, 1916; Temp. 2nd Lieut. R. C. Fielder, Gen. List, from an Equipment Officer, 3rd Cl.; Temp. 2nd Lieut. (on prob.) W. L. C. White, Gen. List; May 26th. Temp. 2nd Lieut. D. A. Stewart, Gen. List; May 29th.

Flying Officers (Observers).—Temp. 2nd Lieut. E. A. Windridge, N. Staff. R., seniority Dec. 28th, and to be transf'd. to Gen. List; Temp. Lieut. W. G. E. Hayman, A.S.C., seniority Feb. 13th, and to be transf'd. to Gen. List; Temp. 2nd Lieut. C. J. McGraive, R. Dub. Fus., seniority Feb. 16th, and to be transf'd. to Gen. List; May 25th. 2nd Lieut. V. H. Hughes, R.G.A., S.R.; 2nd Lieut. W. McC. Taylor, Arg. and Suthd. Highrs. (T.F.), and to be secd.; May 25th, seniority Feb. 17th. 2nd Lieut. G. S. Gordon, Sco. Rif. (T.F.), seniority Feb. 21st, and to be secd. 2nd Lieut. J. C. Trulock, R.F.A., S.R., seniority Mar. 8th; Temp. 2nd Lieut. (on prob.) L. H. McRobert, Gen. List, seniority May 9th; May 24th.

Balloon Commander (graded as a Balloon Officer).—Lieut. (Temp. Capt.) R. C. Talbot, R.F.A. (T.F.), from a Balloon Officer; April 24th.

Balloon Officer.—Temp. 2nd Lieut. (on prob.) C. A. Stiles, Gen. List; May 17th.

Equipment Officer, 3rd Class.—Temp. Capt. H. W. Phear, Gen. List, to revert from an Experimental Officer, 1st Cl. (graded as an Equipment Officer, 1st Cl.), and to the rank of Temp. Lieut. at his own request; May 8th.

Temp. Lieut. G. C. Macintosh, Cape Coloured Corps, to be Temp. Lieut. on Gen. List, for duty with R.F.C.; Dec. 31st, seniority April 18th, 1916.

To be Temp. Lieuts. whilst serving with R.F.C.: Temp. 2nd Lieut. W. G. Barlow; May 1st. Temp. 2nd Lieut. C. G. Baker; May 18th. 2nd Lieut. S. Crosfield, Ches. R. (T.F.); June 2nd.

Temp. 2nd Lieut. A. R. Martin, Gen. List, to take rank and precedence in the R.F.C. and in the Army as if his appointment as Temp. 2nd Lieut. bore date May 2nd.

To be Temp. 2nd Lieuts. (on prob.) for duty with R.F.C., May 14th, seniority as stated: J. L. Des Lauriers; Mar. 10th. C. H. Holcombe, O. A. Moore; Mar. 14th. J. E. Drummond; Mar. 19th. L. R. Charron, M. F. Cunningham; Mar. 21st. C. G. Scobie, G. O. Johnson; Mar. 24th. F. M. Macfarland; W. G. McCormack, P. V. Tempest; Mar. 31st. A. de Niverville, H. A. Lyon, A. Chapdelaine, J. C. R. Leduc; April 2nd. V. A. Barbeau, W. H. Cameron, J. J. McGill, W. H. R. Gould, H. J. Macdonald, D. G. McLean, E. P. Crossen, H. E. Davies, E. G. Dickie, A. G. Dow, W. E. Durant, J. A. A. Ferguson, J. B. Mulvey, H. E. Thomson, C. W. Primeau, J. L. Phillips, F. A. Nethercott, C. W. Robinson, W. E. Windover, F. K. Wilson, H. W. Turner, B. S. Johnston; April 3rd. J. W. Chapman, G. W. Bulmer, J. L. McIntock, E. C. J. McCracken, J. N. Cunningham, G. A. Firby, E. B. G. Norton, J. J. Davidson, G. R. Gray, R. W. Ryan; April 4th. R. M. McCormack; April 9th. H. E. Bryant, D. A. McRae, C. V. McArthur, H. J. Watts, W. H. Kilbourne; April 12th.

2nd Lieut. H. V. Rabagliati, from R.F.C., S.R., to be Temp. 2nd Lieut. on Gen. List for duty with R.F.C.; July 21st, seniority April 22nd, 1916. (Substituted for notification in the *Gazette* of Aug. 17th.)

Supplementary to Regular Corps.—The following 2nd Lieuts. (on prob.) are confirmed in their rank: H. T. Hammond, H. Ross, R. O. King, J. A. Raymond, A. W. Porter.

Squadron Commanders.—From Flight-Comdrs., and to be Temp. Majors whilst so employed: Lieut. (Temp. Capt.) C. C. Miles, M.C., S.R.; Mar. 19th. Capt. H. F. A. Gordon, York. and Lanc. R.; June 3rd.

Flight-Commanders.—Capt. F. W. Hudson, Norf. R., from a Flying Officer; May 23rd. From Flying Officers, and to be Temp. Capt. whilst so employed: 2nd Lieut. A. G. Jones-Williams, Welsh R.; May 25th. Temp. 2nd Lieut. B. Mews, Gen. List; May 28th. Temp. 2nd Lieut. J. W. Somers, Gen. List; June 7th.

Flying Officers.—Temp. 2nd Lieut. (on prob.) T. W. White, Gen. List; April 20th. 2nd Lieut. B. R. Davis, R. Fus., S.R., from a Garrn. Bn., Northn. R., and to be secd.; May 3rd. Capt. A. R. Fortin, Can. A.S.C.; May 9th. 2nd Lieut. K. Shelton, E. Kent R., S.R., from Machine Gun Corps, and to remain secd.; May 10th. 2nd Lieut. J. A. Raymond, S.R.; Capt. F. W. Hudson, Norf. R., from a Flying Officer (Ob.), seniority Aug. 18th; 2nd Lieut. P. F. Antelme, S.R.; Temp. 2nd Lieut. (on prob.) H. F. Stevens, Gen. List; May 22nd. Capt. A. L. Taylor, Can. Inf., from a Flying Officer (Ob.), seniority May 1st, 1916; 2nd Lieut. (Temp. Lieut.) H. S. E. Bond, Welsh R. (T.F.), and to be secd.; Lieut. J. P. Cunnigame, Can. Exped. Force; Lieut. A. B. Fairclough, Can. Mach. Gun Corps; May 23rd. Lieut. A. P. Field, Lond. R. (T.F.), and to be secd.; May 24th. Lieut. J. H. Butler, R. Ir. Rif., S.R., from Mach. Gun Corps, and to remain secd.; Lieut. H. W. Joslyn, Can. Gen. List; 2nd Lieut. (on prob.) C. H. Cameron, S.R.; May 25th. Lieut. (Temp. Capt.)

C. G. Guy, Northn. R. (T.F.), and to be secd.; 2nd Lieut. (Temp. Lieut.) S. N. Evans, Suff. R. (T.F.), and to be secd.; 2nd Lieut. C. A. Bell, R.F.A. (T.F.), and to be secd.; 2nd Lieut. W. E. Hall, Lond. R. (T.F.), and to be secd.; 2nd Lieut. G. M. Knocker, R.A., and to be secd.; Temp. 2nd Lieut. (on prob.) R. A. S. Phillips, Gen. List; May 26th. Temp. 2nd Lieut. L. W. Osman, attd. Rif. Brig., and to be transf'd. to Gen. List; Temp. 2nd Lieut. (on prob.) J. A. Dales, Gen. List; Temp. 2nd Lieut. (on prob.) P. I. Lewis, Gen. List; May 27th.

Adjutants.—From Flying Officers (Ob.): Lieut. L. A. K. Butt, S. Staff. R.; May 18th. Temp. Lieut. W. L. Hill, Gen. List; May 26th.

Equipment Officers, 1st Class.—And to be Temp. Capt. whilst so employed: Temp. Hon. Lieut. W. S. Smith, Gen. List; 2nd Lieut. C. L. Archbold from the 3rd Cl.; May 27th.

2nd Class.—2nd Lieut. F. Mayer, S.R., and to be Temp. Lieut. whilst so employed;—April 30th; Lieut. J. W. Yuille, Can. Inf., from the 3rd Cl.; May 1st. And to be Temp. Lieuts. whilst so employed: 2nd Lieut. F. L. Royle, Yorks. L.I. (T.F.), from a Flying Officer; May 9th. 2nd Lieut. J. Rylands, from the 3rd Cl.; May 27th.

3rd Class.—Lieut. J. W. Yuille, Can. Inf., from a Flying Officer; Feb. 5th. Temp. 2nd Lieut. F. Crompton, Gen. List; Feb. 7th. 2nd Lieut. R. O. King, S.R.; Mar. 25th. Temp. 2nd Lieut. R. G. Simmonds, Garrn. Bn., Worc. R., and to be transf'd. to Gen. List; April 16th. 2nd Lieut. (on prob.) D. P. Gibson, S.R.; May 5th. Temp. 2nd Lieut. (on prob.) A. L. Simms, Gen. List; May 7th. Or.-Mr. and Hon. Lieut. P. J. Burns (T.F. Res.); May 31st.

Experimental Officers, 2nd Class (graded as Equipment Officers, 2nd Class).—2nd Lieut. (Temp. Lieut.) W. C. Mitchell, R.F.A., S.R., and to retain his temp. rank whilst so employed; 2nd Lieut. W. V. Bevon, S.R., and to be Temp. Lieut. whilst so employed; Mya 1st.

Supplementary to Regular Corps.—2nd Lieut. H. R. Lumley is placed on the Ret. List on account of ill-health; June 17th.

London Gazette Supplement, June 18th.

Flying Officers.—Lieut. A. W. Hawkins, York. R., and to be secd.; 2nd Lieut. H. S. Baldwin, Worc. R., S.R., and to be secd.; April 28th. Temp. Lieut. E. G. Bannister, attd. R. Fus., and to be transf'd. to Gen. List; 2nd Lieut. H. R. Gardner, Bedf. R. (T.F.), and to be secd.; May 1st. Temp. 2nd Lieut. (Temp. Lieut.) W. K. Sutton, Gen. List, from a Flying Officer (Ob.), seniority Dec. 6th, 1915; 2nd Lieut. (Temp. Lieut.) M. G. Begg, M.C., Rif. Brig., S.R., from a Flying Officer (Ob.), seniority Feb. 24th, 1916; May 3rd. Temp. 2nd Lieut. A. E. Morgan, S. Wales Bord.; May 9th. 2nd Lieut. E. T. H. Ellis, R.E. (T.F.), from a Flying Officer (Ob.), seniority June 22nd, 1916; 2nd Lieut. W. F. Willis, S.R.; Temp. 2nd Lieut. (on prob.) V. F. Toulmin, Gen. List; May 10th. 2nd Lieut. D. M. Rooke, R.F.A., S.R.; May 12th. 2nd Lieut. E. S. Bacon, R.F.A. (T.F.), and to be secd.; May 15th. Temp. 2nd Lieut. (on prob.) F. M. M. Ellis, Gen. List; Temp. 2nd Lieut. (on prob.) W. D. H. Baird, Gen. List; May 22nd. Capt. W. T. Wood, Can. Gen. List; Temp. 2nd Lieut. (on prob.) J. A. Inman, Gen. List; May 23rd. 2nd Lieut. G. J. Smith, R.F.A. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) H. E. MacFarlane, Gen. List; May 25th. Temp. 2nd Lieut. (on prob.) R. W. Mouritzen, Gen. List (since killed); May 25th. 2nd Lieut. J. B. Carling, S.R.; 2nd Lieut. J. Chesney, S.R.; May 26th. 2nd Lieut. (on prob.) G. A. Mitchell, S.R.; Lieut. (Temp. Capt.) H. Patch, S. Lan. R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) C. A. Hargreaves, Gen. List; May 27th. 2nd Lieut. P. W. Smith, Yeo. (T.F.), and to be secd.; Capt. C. G. E. Yarde, Northn. R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) E. Holdsworth, Gen. List, seniority April 5th; Temp. 2nd Lieut. (on prob.) C. G. Mallous, Gen. List; 2nd Lieut. (on prob.) L. Read, S.R.; Temp. 2nd Lieut. (on prob.) R. S. V. Elliott, Gen. List; Lieut. E. R. Openshaw, Som. L.I. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) G. S. Lee, Gen. List; May 28th. Temp. 2nd Lieut. W. A. L. Spencer, Gen. List, from a Flying Officer (Ob.), seniority Oct. 6th; Temp. 2nd Lieut. (on prob.) H. D. Turner, Gen. List; 2nd Lieut. E. W. Fletcher, Essex R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) D. A. Wright, Gen. List; Temp. 2nd Lieut. (on prob.) N. L. Garstin, Gen. List; Temp. Lieut. R. S. S. Ingram, Gen. List, from a Flying Officer (Ob.), seniority June 1st, 1916; 2nd Lieut. J. Crafter, M.C., Lond. R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) D. W. Sibley, Gen. List; 2nd Lieut. (on prob.) G. T. W. Birkett, S.R.; 2nd Lieut. (on prob.) A. Macdonald, S.R.; May 29th. Temp. 2nd Lieut. (on prob.) R. S. C. D. Ashby, Gen. List; Temp. 2nd Lieut. D. Shanks, attd. R. Suss. R., and to be transf'd. to Gen. List; Temp. 2nd Lieut. (on prob.) M. S. West, Gen. List; May 30th. Lieut. (Temp. Capt.) H. B. Coomber, Manch. R. (T.F.), and to be secd.; Temp. 2nd Lieut. (on prob.) G. F. Hunter, Gen. List; Temp. 2nd Lieut. (on prob.) L. O. Harel, Gen. List; May 31st.

Flying Officers (Observers).—Temp. 2nd Lieut. C. A. Malcolmson, Gen. List; May 31st, seniority Feb. 3rd. 2nd Lieut. F. Tyms, M.C., S. Lan. R. (T.F.), and to be secd.; June 1st, seniority Feb. 16th. Temp. 2nd Lieut. A. Shallcross, Worc. R., and to be transf'd. to Gen. List; May 31st, seniority Feb. 20th. 2nd Lieut. F. Williams, R.W. Fus. (T.F.), and to be secd.; June 2nd, seniority Mar. 4th. Temp. 2nd Lieut. F. C. Hoult, Rif. Brig., and to be transf'd. to Gen. List; June 1st, seniority Mar. 4th. Temp. Lieut. F. G. Detmold, R.A., and to be transf'd. to Gen. List; June 2nd, seniority Mar. 26th. Lieut. F. A. N. Haultain, Can. Inf., seniority April 7th. Lieut. E. O. Houghton, Can. Inf., seniority April 14th; May 31st. Lieut. W. K. Anderson, Can. Inf.; June 2nd, seniority April 23rd.

Equipment Officers, 1st Class.—From the 2nd Cl., and to be Temp. Capt. whilst so employed: Lieut. S. A. Laird, S.R.; Feb. 12th. 2nd Lieut. (Temp. Lieut.) P. M. Thesiger, Yeo. (T.F.); 2nd Lieut. (Temp. Lieut.) A. Hunter, W. Rid. R.; May 1st.

3rd Class.—2nd Lieut. (on prob.) F. C. Gorrings, S.R.; April 9th. Lieut. (Temp. Capt.) R. C. Gallop, Sco. Rif., from a Flight-Comdr., and to relinquish his temp. rank; April 12th. Temp. 2nd Lieut. (on prob.) W. H. D. Chamberlain, Gen. List; May 19th.

Supplementary to Regular Corps.—2nd Lieuts. (on prob.) confirmed in their rank: W. F. Willis, D. P. Gibson, C. H. Cameron, J. B. Carling, F. W. Rook, G. B. MacQuarrie, A. B. Hill, C. W. Davies, A. R. B. Gill and J. Chesney.

The Destruction of "L. 43."

THE Secretary of the Admiralty issued the following announcement on June 14th:—

"Zeppelin 'L. 43' was destroyed this morning by our naval forces in the North Sea. Soon after being attacked she burst into flames fore and aft, broke in two and fell into the sea. No survivors were seen."

An official telegram from Berlin on Saturday stated:—

"Naval airship 'L. 43' is missing since Thursday last. According to English reports it was brought down in the North Sea by English naval forces."

R.N.A.S. Work in Belgium, &c.

THE Admiralty issued the following on June 16th:—

"A squadron of our R.N.A.S. machines bombed the St.

Denis Westrem Aerodrome this morning. A large number of bombs were dropped on objective. Very good shooting appeared to have been made. Many direct hits were observed, from which dense columns of smoke and flames were seen to rise. All our machines returned safely."

Aeroplanes in Naval Scrap.

FROM the Admiralty statement refuting the German lies as to the alleged inhumanity of the British commander who sunk the "Szo," it emerges that as the German seamen swam away it became necessary to recall the boat which was attempting to rescue the survivors, because three enemy aeroplanes were overhead, apparently about to drop bombs (as was done in similar circumstances when the survivors of the "Blücher" were being rescued).

AERONAUTICAL SOCIETY OF GREAT BRITAIN.

OFFICIAL REPORT.

THE Annual General Meeting of the Aeronautical Society of Great Britain was held on Wednesday, June 13th, 1917, at 7 p.m. at the Offices of the Society, 7, Albemarle Street, London, W.1. The Chairman of Council (Major-General R. M. Ruck, C.M.G., C.B., R.E.) presided.

The Secretary read the notice convening the meeting. The Chairman asked that the meeting approve the postponement until that evening, owing to the removal to the new offices, of the Annual General Meeting, which should under Rule 11 have been held before March 31st. The postponement was approved.

The Annual Report of the Council and Accounts having been circulated were formally approved.

The Secretary read the proposals put forward by the Council for the alteration of the Rules of the Society.

An amendment, moved by Mr. Cooper, seconded by Dr. Stanton, supported by Dr. Walmesley, was embodied in the Council's proposals and adopted *nem. con.* :—

"That Rule 23 (c) shall now read :—Every Fellow of the Society shall be elected by the Council of the Society, and the names of those elected shall be submitted for confirmation at the next ensuing general meeting." And that Rule 23 (d) shall read :—"Every Associate Fellow of the Society shall be elected by the Council of the Society and the names of those elected shall be submitted for confirmation at the next ensuing general meeting."

It was recommended by the Council that the entrance fee of ten shillings charged to Student Members of the Society be remitted for the next ensuing twelve months. The recommendation was unanimously adopted.

◆ ◆ ◆ "LOOKING AHEAD." ◆ ◆ ◆

THE following is a note relating to Commercial Aeronautics which Lieut.-Col. O'Gorman added to his Wilbur Wright lecture which was published in "FLIGHT" last week.

Commercial aeronautics are bound up with using the values which accrue incidentally to the employment of aircraft. I take these of three :—

- A. The speed of transit made available.
- B. The directness of the route which can be selected.
- C. The utilisation of helpful winds and evading bad weather.

Everyone finds himself confronted with the necessity of knowing even vaguely the possible objects of commercial aeronautics when starting to discuss the information desired. This arises from the extremely fine-cut qualities of aircraft design, which conduce to specialisation of each machine to specific purpose. In view of this, it is not wise, I think, to say even that the "weight per horse power" ratio of the complete loaded aeroplane is a direct criterion of the efficiency of a design, however strongly we may recognise its value, and I do admit the essential necessity for a clear summarisation of the "weight per horse power" ratios of all possible sizes and kinds of aeroplanes, together with the performances and other data. We need these for the sake of the light they will cast upon the value of a high horse power per lb. weight. I do not think that commercial aeronautics will in fact find that the exaggerated ratio of power to weight which is so useful for war reasons will be demanded for peace uses; it is to settle this point among others that the summarising work is needed *now*. It is, then, a matter for study to determine (a) What is the amount of gross weight that may be safely entrusted to a given or available b.h.p.?

(b) What is the amount of gross weight that may be safely entrusted to a given wing area, as both will differ according to the class of usage? The Aero Society and S.B.A.C. Joint Committee is fully warranted in asking for funds and powers to co-ordinate the information on which the thinking process of the designer must be based. For transit over a district in an aeroplane which is not exposed to attack from land guns or pursuing aeroplane there appears to be no urgent need for phenomenal rates of climb in certain, and probably in most, commercial classes of craft. All commercial work will, however, require some rate of climb yet to be determined; what is the minimum which is safe for overland work on the one hand and oversea work on the other? In a country of small spaces like Britain the distinction will be marked—in wide open lands the two will approach one another.

To make the idea concrete 500 ft. per min. climb from ground level is a possible safe figure over England, while much less is safe over sea. Whatever the figure, once this is achieved, any further climbing ability would be got either for some particular reason or would be got only by the accident that the demand for engine power arising from the *speed* desired gave the extra climbing ability.

It was moved by Mr. Cooper, seconded by Dr. Stanton, and unanimously resolved that consideration be deferred of the recommendations of the Council contained in the agenda paper as follows :—

1. That the grade known as "Associate Fellow" be in future known by the name "Member."
2. That the grade now known by the name "Member" be in future known by the name "Associate."
3. That the grade now known by the name "Associate Member" be in future abolished, and the present Members thereof transferred to the "Associate" grade.

together with the further proposals dependent upon these clauses. The Chairman explained that the Council's recommendations had been very fully discussed in Council and were supported by very serious arguments. There was, however, no desire to enforce them upon the Society without the fullest possible discussion. The step taken was one of considerable gravity, and he was certain that the meeting had taken the right course under all the circumstances. There had been some inquiry among the voters of the Society as to the precise effect of the changes suggested, many of whom were unable to be present there that night, and he personally welcomed the opportunity now afforded them of further information.

Messrs. Griffith Brewer, C. S. Turner and Turnbull were appointed Scrutineers of the ballot for the Council, and on account of the votes received the following were declared elected: Lieut.-Col. O'Gorman, C.B., Mr. A. E. Berriman, Mr. F. Handley Page, Mr. G. Holt Thomas, Commander W. Briggs, Commander Alec Ogilvie, Lieut. A. P. Thurston and Mr. B. G. Cooper. The Meeting then terminated.

One of the matters which the Joint Committee is concerned to establish at an early date is, what is the minimum safe climbing rate under the two broad classes?

- (A) Over Britain (or country of such small alighting areas).
- (B) Over sea (or large spaces).

A good deal of this could be collected from pilots *now*, and the Research Bureau be informed.

Next, given that the minimum climbing ratio is secured, we shall find that some of the design will be needed:

- (a) For high speed expressly.
- (b) For weight carrying.
- (c) For long-distance work (which does *not* make quite the same demands as weight carrying for short distances, notably because low head resistance is cardinal in (c) class).
- (d) For intermediate and special duties.

As soon as rapid climb and quick manœuvring are not demanded differences in design will appear. Class (a) and (c) above will need wing sections like those in war craft, when extremely low head resistance is cardinal. Class (b), which will no doubt be wanted for war, will differ in its wing sections from the "minimum head resistance" classes. In all cases, since high controllability and quick manœuvring will be far less essential than in war, it will be much easier to get a reasonable factor of strength, which means that an adequate strength may be got with light weight. We cannot afford to overlook the importance of using the wind, and thus frequently doubling, say, our speed of transit and halving our fuel cost. It becomes therefore a matter of the greatest moment to know at what height to fly to get best economy, *i.e.*, for the minimum total fuel expense, for fuel bills will be enormous. It is to be noted that height enters into the matter in a far more serious way than in relation to the mere extra fuel needed to *climb* to the height for the journey. There is the extra fuel expended in remaining at the selected height, when any such height is desired as requires the machine to fly appreciably *cabre*, *i.e.*, beyond the "maximum point" on the curve of "lift/drag ratio" of the aeroplane measured as a whole. This indicates another study—the ascertaining of the height of economical travel with the wind (obviously the height of economical travel against the wind is as low as possible consistent with a safe range of glide to alight).

For the purpose of the study it is necessary to have as large a number as possible of lift/drag curves of completed machines in the first place, and in the second place the lift/drag ratio of the entities constituting these machines, so as to get clearly any correction factor which arises from their assembling and mutual interference, and from scale effect.

I am aware that I am putting forward a programme of very great extent, but if the country is to take the air *and* keep it, the sooner these matters are fairly faced the better.

AIRCRAFT IN THE MESSINES BATTLE.

In a message to the *Daily Telegraph*, dated June 9th, Mr. Philip Gibbs said:—

"As scouts of the gunners, as their watchers and signallers, were the boys of the Royal Flying Corps. I said yesterday that they were uplifted with a kind of intoxication of enthusiasm. A youthful madness took possession of them. Those squadrons which I saw flying overhead while it was still dark on Thursday morning, did dare-devil, reckless, almost incredible things. They flew as men inspired by passion and a fierce joy of battle. They were hunters seeking their prey. They were Berserkers of the air, determined to kill though they should be killed, to scatter death among the enemy, to destroy him in the air and on the earth, to smite him in his body and in his works and in his soul by a terror of him. This may seem language of exaggeration, the silly fantasy of a writing man careless of the exact truth. It is less than the truth, and the sober facts are wild things. Early on June 7th, they were up and away, as I described them, passing overhead on that fateful morning before the crimson feather clouds appeared over the battlefield. They flew above the German railway stations far behind the lines and dropped tons of explosive, blowing up rolling stock, and smashing rails and bridges. They attacked the German aerodromes, flying low to the level of the sheds and spattering them with machine-gun bullets so that no German airmen came out of them that day. One man's flight, told in his own dry words, is like the wild nightmare of an airman's dream. He flew to a German aerodrome and circled round. A German machine gun spat out bullets at him. The airman saw it, swooped over it, and fired at the gunner. He saw his bullets hit the gun. The man ceased fire, screamed, and ran for cover. Then our airman flew off, chased trains, and fired into their windows. He flew over small bodies of troops on the march, stooped, fired, and scattered them. Afterwards he met a convoy going to Comines, and he circled over them, hardly higher than their heads, and fired into them. Near Warneton he came upon troops massing for a counter-attack, and made a new attack, inflicting casualties and making them run in all directions.

"Another man found himself under fire of the Archies mounted on lorries. He dived and fired on the gunners, who ran away and hid. One of our flying men attacked and silenced four machine-gun teams in a strong emplacement. Others cleared trenches of German soldiers, who scuttled like rabbits into the dug-outs. They fired everything they carried which would kill the enemy or destroy his material. Having used up all his Lewis gun ammunition upon the marching troops, one lad fired his very lights, his signal rockets, at the next group of men he saw. The airmen flew at the field gunners and put them to flight; at the heavy guns crawling along the roads on caterpillar wheels; at transport wagons, motor lorries; and one motor car, whose passengers, if they live, will never forget that sudden rush of wings four feet overhead, with a spasm of bullets about them. The aeroplane was so low that the pilot thought he would crash into the motor car, but he just planed clear of it as the driver steered it sharply into a ditch, where it overturned with its five occupants. The airman went on his journey, scattered 500 infantry, and returned home after a long flight, never higher than 500 feet above ground.

"Meanwhile, during the progress of the battle, our air squadrons appointed for artillery observation work were all over the enemy's batteries signalling our gunners and sending back 'O.K.' flashes when our counter-battery work was effective. There were an amazing number of 'O.K.'s. One air squadron alone helped a group of heavies to silence 72 batteries. Everywhere over the battle ground our air scouts were out and about, watching the progress of the infantry, speaking to them by signals, picking up their answers, flying back to headquarters with certain information, so that the direction of the battle was helped enormously by this quick intelligence. It was a day of triumph for the Royal Flying Corps and for all those boys with wings on their breasts who after their day's flight come down to French estaminets to the rattle of ragtime on untuned pianos, to give glad eyes to any pretty girl about, to fling themselves into the joy of life which they risk so lightly."

The special correspondent of the *Times*, writing on June 7th, said:—

"Simultaneously with the merciless pounding of our guns and the unceasing raiding by the infantry, our airmen have waged a fierce and brilliantly successful war on the enemy machines, so that on the front of this one army, General Plumer's army, our airmen between June 1st and 6th crashed 24 enemy machines and drove down 23 out of control, losing in all the fighting only 10 machines themselves.

"Among the squadrons included in this area is that of which I recently told the extraordinary tale of how five of our machines fought 27 Germans, wrecking eight of them and themselves all getting home safely. The whole record of our air service during these last few weeks has been extraordinarily fine."

Writing on June 10th, he said:—

"Information as to enemy movements and battery positions, and so forth, is largely got from aeroplane observation, and the value of our airmen's contribution to the victory is beyond computation. In the official *communique* of Friday evening there was a simple sentence, namely, 'The enemy's aircraft were prevented from taking part in the battle.' This is absolutely true, and no higher tribute to our Air Service could be paid.

"The general public thinks of the Air Service chiefly in terms of air fighting and in numbers of machines brought down. In my despatch of Thursday I gave the figures, which showed that even by that standard, our airmen were vastly superior to the Germans. But air fighting, with the bringing down of enemy machines, is only an incident of the work of the Flying Corps.

"The essential work is, first, observation, and secondly, harassing, by bombing raids, &c., the enemy's communications.

"Before this attack, it must be remembered, that the enemy held the high ground on the Ridge, and he could see us, while we, from the ground, could not see him. We have had to rely for observation chiefly on the air. Yet, on the day of the battle itself, our guns assigned to counter-battery work simply smothered the enemy's artillery.

"One squadron of the R.F.C. alone on that day gave observation reports which enabled our gunners to silence no fewer than 72 enemy batteries. One brigade sent in 390 shells, in response to which our guns are known to have obtained 160 direct hits on objectives, and it should be noted that, after a call is turned in, an aeroplane is usually too busy elsewhere to note whether the shooting in response is effective or not. So the total number of effective hits was doubtless much larger than is known.

"Besides this, in the early morning of the day of the attack, and during the course of the action, our airmen raided all the enemy aerodromes in the area, and dropped over three tons of explosives on them, or on other points of military importance.

"Beyond this, during the battle, our airmen flew down and attacked from close at hand some 60 different concentrations of German troops or battalions marching on the road for reinforcements, thus immensely impeding the movement of the German military machine.

"This is only part of what our aircraft did while 'the enemy's aircraft were prevented from taking part in the battle.' Never, I believe, in any operation of this war has any branch of any Army been more splendidly effective than has our Air Service, but the performances of our Flying Corps in this battle must be made the subject of a separate despatch."

Mr. W. Beach Thomas, in the *Daily Mail*, gives the following stories of the fighting:—

"One further story of the battle. A British airman fighting for the first time engaged in a big battle with a number of craft on both sides. At a crisis he tried a spinning dive, but fell some 8,000 ft., before he could straighten himself. Just as he did so, when within some 2,000 ft. of the ground, he saw two German planes in quick succession tumble past him. They had been shot down in battle high above. But this was not the end of his experience of thunderbolts. As he began to mount again to try to join battle, a third German plane almost fell down on top of him. Did ever man before experience in such a measure what Tennyson in prophetic mood called 'the ghastly dew of airy navies'? But it is all in the day's work.

"At sunset yesterday I went to a big aerodrome to see the birds come home to roost. The ground was almost empty and the air almost full. Our fighting patrols had failed to find a single enemy, though they had sought far and wide. Full of unexhausted vitality they expended it in playing every imaginable trick. They turned somersaults, spinning headlong in twisting tumbles like a blown leaf; they looped and flew on their backs; and played hide and seek with trees, and swooped like hawks and skimmed like swallows, and towered like cranes and drummed like snipe. It was all training for battle, and this evening all was well, for every bird had come home to roost. The naval triplanes that climb straight like a lift, the fighting bullets with the bullet flight, and the slow and dignified biplane observers—to-day none of all these had lost a bird."

AIRCRAFT WORK AT THE FRONT.

OFFICIAL INFORMATION.

British.

General Headquarters, June 9th.
 "In the course of bombing raids carried out by our aeroplanes against the enemy's railway stations on the night of the 7th-8th inst., a large accumulation of rolling stock containing ammunition was detonated by a bomb. The fires and explosions caused continued until dawn. Yesterday three German aeroplanes were brought down in air fighting, and four others were driven down out of control. Six of our aeroplanes are missing. Two of these were lost as the result of a collision during a fight with a number of hostile machines over the enemy's lines."

General Headquarters, June 10th.
 "Six German aeroplanes were brought down yesterday in air fighting, and three other hostile machines were driven down out of control. Three of our aeroplanes are missing."

General Headquarters, June 12th.
 "Our aeroplanes were active yesterday, although weather conditions were not favourable, and much useful work was accomplished. One of our machines is missing."

General Headquarters, June 13th.
 "Our aeroplanes continued to carry out useful work yesterday. In air fighting three German aeroplanes were brought down, and two others were driven down out of control. Another hostile machine was shot down in our lines by our anti-aircraft guns. All our machines returned safely."

War Office, June 13th.
 "Macedonia.—During the past week our aeroplanes have bombed Angista Station and hostile camps at Savjak (2½ miles north-north-east of Prosenik), Mariupolje, and Puljovo (Upper Struma Valley). Otherwise there is nothing to report."

General Headquarters, June 14th.
 "In air fighting yesterday one German aeroplane was brought down, and three others were driven down out of control. None of our machines are missing."

General Headquarters, June 15th.
 "Four German aeroplanes were brought down yesterday in air fighting, and three others were driven down out of control. Two of our machines failed to return."

General Headquarters, June 16th.
 "Particularly successful work was done by our aeroplanes yesterday both in co-operation with our artillery and in reconnaissances and bombing raids. Many air fights took place, in which large numbers of machines were engaged on either side."

"As a result of the fighting six German aeroplanes were brought down, one of which fell in our lines, and ten other enemy machines were driven down out of control. Our losses for the day are one machine missing."

General Headquarters, June 17th.
 "There was great activity in the air again yesterday. Seven German aeroplanes were brought down in air fighting, two of which fell in our lines. Three other enemy machines were driven down out of control. Two of our aeroplanes are missing."

General Headquarters, June 18th.
 "Yesterday the fighting in the air again went in our favour. Ten German machines were brought down by our aeroplanes, and five others were driven down out of control. Two of our aeroplanes failed to return."

French.

Paris, June 10th.
 "In the period from June 1st to June 7th our aviators engaged in numerous air fights and brought down 21 enemy aeroplanes, whose fall was established, and two captive balloons, which fell in flames."

Paris, June 12th.
 "A German aeroplane was brought down in Lorraine by our special guns. The two aviators were made prisoners."

Salonica.—There has been aerial activity on both sides. British aeroplanes have bombarded Petric. In the course of an air fight an enemy aeroplane was forced to land."

Paris, June 13th.
 "Salonica.—The British air service bombed the enemy depôts at Bogdanci."

Paris, June 15th.
 "Salonica.—British aviators, bombarded the station of Poona."

"The French air service bombarded enemy positions in the direction of Lake Malik."

Paris, June 16th.
 "Salonica.—The British Air Service caused great damage in the enemy camps at Saint Vrac (10 miles north of Petric)."

Russian.

Petrograd, June 8th.
 "On June 1st our airman, Captain Kruten, after a brief encounter, brought down a German aeroplane. Enveloped in flames, the machine fell in the region of the village of Wymyslovka (west of Tarnopol). The aviators and the machine were burned. On June 6th the same Captain Kruten, while returning from a reconnaissance, observed three German aeroplanes, and, giving them pursuit, overtook the hindmost machine and brought it down with machine-gun fire. It fell on Moletagal, in our territory. The aviators were made prisoners."

Fatal Accidents.

A VERDICT of Accidental Death was returned at an inquest held at York, on June 14th, on Lieut. L. Stephen, who was killed on June 12th while flying in West Yorks. A witness said he saw the machine about 200 ft. up, when something appeared to go wrong with the engine. It finally dived straight to earth, and when he went to the spot he found the deceased lying unconscious by the machine, which was much damaged. An ambulance was sent for, and the deceased was removed, dying on the way to York.

An inquest was held at Edmonton on June 16th on Prob. Fl. Officer K. Stuart, who was thrown out of his machine in landing at an Essex aerodrome. It was stated that he was two seconds too late in "flattening" the aeroplane—an error to which, it was said, even an expert was liable. In consequence the nose of the machine struck the ground. An inquest was also held on Prob. Fl. Officer W. G. Parry. It was stated that he was learning how to land, and when the machine

Petrograd, June 9th.

"Our airmen, Second Cavalry Captain Kozakoff and Second Captain Vergeeff, brought down a German aeroplane, which fell in the region of Kozoff. The aeroplane caught fire, and its occupants were taken prisoners."

Petrograd, June 12th.

"South-east of Jakovshtadt one of our battleplanes was brought down by the German artillery and fell in our territory. The pilot, Captain Kuriloff, was killed, the machine was destroyed. In the region of Shumbiany (to the north-east of Galicz) an enemy aviator set fire to one of our captive balloons, which was burnt; the officer observer, Ipasya, was burnt."

Petrograd, June 16th.

"Four of our bomb-throwers bombarded the railway station at Uzkokoleika, near the small town of Vesen. An enemy squadron consisting of seven machines bombarded Dvinsk and neighbourhood. Our losses and damage were insignificant."

"In the region of the River Stokhod our artillery brought down an enemy aeroplane."

Italian.

Rome, June 11th.

"Our aircraft at the same time, notwithstanding the adverse atmospheric conditions, successfully bombed the enemy's back areas and heavy batteries in the upper valleys of the Astico and Assa. All our machines returned safely."

Rome, June 15th.

"Aerial activity has been intense on the Trentino front. Two enemy aviators were brought down on the slope of Monte Verena and in the valley of the Maggio Torrent. Two others were compelled to land in their own lines in the Val Sugana, and a fifth machine, struck by our fire, fell to earth on the slope of Mont Zebio. One of our machines is missing."

Rome, June 16th.

"Our battleplanes, supported by scout machines, dropped 1,800 kilograms of explosives on enemy hutments and camps in the S. Lucia zone (Tolmino), and in the Bazza Valley. All our machines returned safely."

Rome, June 17th.

"This morning hostile aircraft dropped bombs on Gorizia and some other inhabited localities in the plain. No damage was done, and there were no casualties."

Rome, June 18th.

"Two enemy machines were brought down yesterday by our airmen above Gorizia, and fell east of Vertoiba and near Ranziano, in the Frigido (Vipacco) Valley. During the night two of our airships successfully bombed troops assembled round Tolmino and the enemy batteries on Mount Hermada."

Belgian.

Brussels, June 15th.

"Yesterday our airmen brought down two enemy machines, which fell in the adversary's line. This morning a third German aeroplane was attacked by our airmen and descended in flames near Keyem."

German.

Berlin, June 10th.

"On the day before yesterday, in Flanders, the enemy lost 10 aeroplanes, and yesterday he lost six in aerial battles and as a result of anti-aircraft fire. A few days ago Sergt.-Major Mueller shot down his 14th opponent in aerial encounters."

Berlin, June 12th.

"On Sunday some of our seaplane squadrons successfully bombarded the Russian naval bases at Lebara and Arensburg. Some military buildings were almost entirely destroyed. In the largely-increased aerial activity during the month of May the Flying Corps has achieved great success in the execution of its manifold duties. Among those who have especially distinguished themselves in addition to the battle airmen and infantry airmen, were those indispensable artillery airmen who, admirably supplemented by the observation officers in the captive balloons, directed our fire and observation services. In the West, the East, and in the Balkans, we lost 79 aeroplanes and nine captive balloons. Of the enemy aeroplanes shot down 114 are behind our lines, and 148 were seen to fall behind the enemy positions. Further, the enemy has lost 26 captive balloons and a further 23 aeroplanes, which were compelled to land as a result of fighting."

Berlin, June 14th.

"Russian aviators have become more active of late, and have flown over our lines on several occasions. Since the beginning of June five have been shot down. The dropping of bombs on Tukum was answered by a retaliatory aerial attack on Schlok."

Austrian.

Vienna, June 8th.

"An enemy airman, whose machine bore our marks, dropped bombs behind our front. Enemy air activity was very lively."

Vienna, June 12th.

"In Eastern Galicia there has latterly been an increase in enemy artillery and flying activity."

"Our airman shot down two Italian aeroplanes. An Italian air squadron dropped bombs on Durazzo. Several Albanians were killed."

Bulgarian.

Sofia, June 16th.

"On the entire front there was air activity to our advantage."

was about 300 ft. high it suddenly nose-dived to the ground. It was suggested that he had not heard the instructions given to him. His instructor, Flight-Lieut. Colman, was severely injured.

Lieut. P. Tew (the pilot) and Lieut. Savage (a pupil) were killed by the fall of their machine while flying at a Cotswold aerodrome on June 16th.

An aeroplane in which Lieut. R. H. Herd was the observer nose-dived to earth in Wiltshire on June 16th, and he was burned to death before he could be rescued from his seat. The pilot escaped. The same day 2nd Lieut. L. F. Geeson was fatally injured at an east coast aerodrome.

A German Battle Pioneer Killed.

A REPORT received in Amsterdam is to the effect that Lieut. Josef Schaumburg, said to be the first German aviator to use aeroplanes in battle, and also the first to drop bombs from aeroplanes, was shot down during the battle of Messines by a British pilot. He fell dead in the German lines.

SIDE-WINDS.

THE "Big Push" still continues down Bournemouth way. Not only has much ground been gained, but large reinforcements have been brought up. In other words, the aerodrome has now been considerably enlarged, and new hangars erected to house the fleet of machines. Of the latter there are now 10 in commission, four of which are dual control, whilst there are 36 additional machines in the "reserves." It will be seen, therefore, that the school is well equipped, and so now is the time to join up, for there are vacancies for several new pupils.

MESSRS. S. E. SAUNDERS, LTD., designers and constructors of air and marine craft, of East Cowes, I. of Wight, notify us that their telephone address, which has hitherto been "Cowes 493" is now "Cowes 193" (4 lines).

It often happens that the practical man of business cherishes a volume which is not what is generally meant when a "book" is referred to. Just such a one is that devoted to "Capstan and Turret Lathes and Equipment," which is to hand from Messrs. H. W. Ward and Co., of Lionel Street, Birmingham. Although it is a price list of the many types of lathes, chucks, tool-holders and other attachments which they make, it is much more than that, for it gives full details and illustrations with regard to each. All the dimensions are listed, as well as the code words, so that every part or fitting can be ordered by post or telegraph without the possibility of a mistake being made. Descriptions are also given of the methods of working the various attachments, a feature which should prove very useful to works managers who are laying down equipment for new shops or replacing some of their worn or out-of-date machine tools. The book is fully illustrated not only by photographs of complete lathes, but also by views of each part, and, where necessary, reference letters are used to enable the description to be followed. Anyone who is interested in machine tools can obtain a copy of the book by writing to Messrs. H. W. Ward and Co., Ltd., Lionel Street, Birmingham, and, as we have indicated above, once it is obtained its character will ensure it being taken care of.

THINGS are going strong at the Chester Flying School, and those pupils who are fixed up there report a busy time and much progress these last few weeks. The aerodrome has 150 acres of clear ground, and the flying radius of 3 miles gives excellent landing all round, it being all reclaimed land and very flat. Being both an engineer and a pilot, Mr. Dutton is able to personally supervise everything and see that his orders are properly carried out, while in Mr. Smith, late of the Hall School, he has a very capable instructor. The school is fortunate in having a big supply of spares, in the way of engines, props, &c., so that the smashes which are inevitable do not mean any great delay. Apart from the Caudrons in use at the school, an Avro is now being assembled and another Caudron is on the stocks.

FROM Messrs. Hays, Hunter and Standen, Ltd., 110, Cannon Street, London, E.C., comes a list of carbon and high-speed drills, hacksaw blades, spanners, taps, bolts, nuts, &c., which they have in stock at the present time. Buyers of goods such as those should drop a line to Messrs. Hays, Hunter and Standen asking for these stock lists to be sent regularly. The firm keep a large variety of these small tools in stock and usually they have a good stock of each size.

BARIMAR, LTD., scientific welding engineers and sheet metal workers, 10, Poland Street, Oxford Street, London, W., would be glad if any of our readers who are property owners, lessees or agents who have to let in Central London factory premises, with offices, warehouses, with yard, facilities for extension and back or flank entrances, would communicate with them.

Leader of Air Raid on London.

ACCORDING to a Berlin semi-official telegram, the leader of the German air squadron which attacked London on June 13th was Captain Brandenburg.

German Aviators Interned.

THE two occupants of a German aeroplane which landed at Axel, Holland, on June 14th, according to their story having lost their way, have been interned.

A German Raid in the Riga District.

A TELEGRAM from Petrograd states that seven German seaplanes flew on June 13th over the Russian islands in the Gulf of Riga. They dropped 58 bombs, killing three of the inhabitants and injuring two.

Zeppelin Off Sweden.

FROM Copenhagen it is reported that on June 16th, at 3 p.m., a Zeppelin was observed outside the Swedish harbour of Cimbrishamn. Suddenly a violent cannonade was directed against it, and it withdrew in a damaged condition.

A Zeppelin Over Holland.

Het Volk, under the heading "A Violation of Neutrality," on Monday published reports from Winschoten, Hoogezand, Stadskanaal, Leek, Nijpe and Haarlingen, stating that on the previous morning a Zeppelin flew over these places, using search and signal lights.

The Raid on Ghent.

FROM the frontier the *Telegraaf* learns that on June 16th, after very intense air activity above Ghent, it became known that the factory of Carels Freres, where the Germans have been manufacturing munitions, was hit by three bombs and totally burnt down. The building occupied by the Kommandantur was also hit by a bomb and destroyed by fire. A great number of civilians, workmen and soldiers were killed. The premises have been rigorously isolated.

The Germans and the Estuary Raid.

It is characteristic of the Hun that in connection with the raid on the Thames Estuary the German newspapers did not publish the Admiralty *communiqué* regarding the successful attack by the Dunkirk squadron on the returning raiders. Although the reports which were published in Germany were evidently intended to show the raid as having been successful, the newspapers were apparently ordered not to give prominence to the subject.

An Expensive Nut.

A BOLT and nut from a German aeroplane brought down by British airmen in France fetched 30s. at a Highbury meeting for providing comforts for the men of "Islington's Own" battalion.

IMPORTS AND EXPORTS, 1916-1917.

AEROPLANES, airships, balloons, and parts thereof (not shown separately before 1910). For 1910 and 1911 figures, see "FLIGHT" for January 25th, 1912; for 1912 and 1913, see "FLIGHT" for January 17th, 1914; for 1914, see "FLIGHT" for January 15th, 1915; for 1915, see "FLIGHT" for January 13th, 1916; and for 1916, see "FLIGHT" for January 11th, 1917.

	Imports.		Exports.		Re-Exportation.	
	1916.	1917.	1916.	1917.	1916.	1917.
January ...	1,509	10,842	6,399	67,033	Nil.	Nil.
February ...	6,444	9,479	30,693	26,512	—	6
March ...	3,388	11,158	17,872	58,517	7	—
April ...	3,383	21,141	22,608	21,151	3,783	—
May ...	1,986	6,877	26,165	59,713	300	—
	16,710	59,497	103,737	232,926	4,090	6

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National Physical Laboratory Report for the Year 1916-17, Teddington: The National Physical Laboratory.

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